Edge Hill University

Promoting Adult Physical Activity in West Lancashire through Exercise Referral

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Abstract

Background: Exercise referral schemes (ERSs) are widely adopted physical activity (PA) interventions for insufficiently active individuals with existing health conditions. Despite the prevalence of ERSs across the UK, completion rates are poor and there remains modest and variable evidence for the ability of ERSs to confer meaningful health-related improvements. This thesis documents the exploration and intervention development of a social-identity-informed peer support intervention to promote participant completion of a West Lancashire-based ERS: Active West Lancs (AWL).

Methods: This thesis adopted a two-phase, mixed-methods approach across five empirical studies. Phase One comprised of a mixed-methods evaluation and needs analysis of AWL. Study one investigated rates of scheme uptake and completion according to participant demographic and referral characteristics. Study two identified pre-post changes in physical (body mass index, blood pressure), behavioural (PA volume, sedentary time), and well-being outcomes. Study three employed semi-structured interviews to elicit in-depth contextual understanding of perceived facilitators and barriers to scheme completion. Phase Two documented the development and acceptability of the social-identity-informed peer support intervention. Study four identified desirable characteristics and roles of AWL peers perceived by existing scheme clients and providers. Study five explored multi-stakeholder perspectives on the intervention's retrospective acceptability.

Results: Study one found AWL uptake and completion rates, as well as socio-demographic patterning of uptake and completion rates, to be comparable with previous ERS evaluations. Older participants, and those referred due to cardiovascular disease or musculoskeletal health

conditions were most likely to uptake and complete, whilst those referred due to mental health were least likely. Study two demonstrated AWL completion to be associated with reductions in BMI, blood pressure and sitting time, as well as increased PA volume and improved well-being. However, the magnitude of change for all outcomes varied according to participants' primary reasons for referral. Study three highlighted perceived facilitators and barriers to AWL completion. Notably, the extent of participants' other commitments and previous PA experiences permeated perceptions of individual-level facilitators and barriers. AWL clients' expectations, experiences, and preferred forms of social support varied, ranging from disinterest in social engagement to the development of strong social support networks. In study four, AWL clients reported no preference for peers of certain ages, sex or physical appearance, though highlighted empathy, positivity and affability as salient personal characteristics. Clients and providers welcomed the prospect of introducing AWL peers in the capacity of providing supplementary emotional, motivational and informational support. Lastly, study five documented details of actual AWL peer behaviour in terms of how scheme providers and clients utilised peers. AWL stakeholders reported high acceptability of peers, though acceptability varied as a function of demographic and personal peer characteristics, with some clients preferring age and/or same sex peers.

Conclusions: Findings provide positive evidence for the contextual appropriateness and acceptability of the AWL peer support intervention. Subsequently, this thesis provides a template to inform the adoption of peer support interventions across a heterogenous range of ERSs. Future work is necessary to investigate the potential for peer support interventions to positively enhance rates of ERS completion.

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Abbreviations

AWL	Active West Lancs exercise referral scheme
BCI	Behaviour change intervention
BMI	Body mass index
BP	Blood pressure
COPD	Chronic obstructive pulmonary disorder
CVD	Cardiovascular disease
DBP	Diastolic blood pressure
DoH	Department of Health
ERO	Exercise referral officer
ERS	Exercise referral scheme
GPs	General practitioners
HRQoL	Health-related quality of life
IMD	Indices of Multiple Deprivation
IPAQ	International Physical Activity Questionnaire
IPAQ-E	International Physical Activity Questionnaire- elderly
IQR	Interquartile range
MET	Metabolic equivalent
MMR	Mixed-methods research
MVPA	Moderate-to-vigorous physical activity
NCD	Noncommunicable disease
NHS	National Health Service
NICE	National Institute for Care and Excellence
NRD	National referral database
NQAF	National Quality Assurance Framework
ONS	Office for National Statistics
OR	Odds ratio
PA	Physical activity
PARS	Physical activity referral schemes
RCT	Randomised controlled trial

REPs	Register of Exercise Professionals
RQ	Research question
SBP	Systolic blood pressure
SCT	Social Cognitive Theory
SD	Standard deviation
SDT	Self-Determination Theory
SES	Socioeconomic status
SWEMWBS	Short Warwick Edinburgh Mental Well-being Scale
TA	Thematic Analysis
TPB	Theory of Planned Behaviour
TTM	Transtheoretical Model of Change
UK	United Kingdom
WHO	World Health Organization
WLBC	West Lancashire Borough Council

Chapter 1: Introduction

The need for physical activity intervention

Physical activity (PA) is associated with the prevention and management of over 20 chronic physical and mental health conditions and diseases, including cardiovascular disease (CVD), type 2 diabetes, breast and colon cancers, and depression (Public Health England, 2019). Further, PA is associated with 30% risk reduction for all-cause mortality. Current guidance for UK adults (19-64 years) and older adults (65+ years) recommend 150 minutes of moderate intensity PA or 75 minutes of vigorous PA, or a combination of both (DHSC, 2019). Moderate intensity PA increases heart and respiratory rates to an extent where breathing is quickened but it would still be possible to hold a conversation whilst talking at a normal cadence. Brisk walking, cycling and swimming are examples of moderate intensity PA. Vigorous intensity PA increases heart and respiratory rates to an extent which induces rapid breathing and makes it difficult to engage in conversation. Examples include running, climbing stairs and playing sports, such as, football or dance (DHSC, 2019). Adults and older adults should also seek to minimise prolonged bouts of sedentary behaviour (SB) (DHSC, 2019). SB is defined as engaging in activities whilst sitting or reclining during waking hours that require little energy expenditure above rest (Owen et al., 2010). Minimising SB is a critical component of PA guidelines due to an association between prolonged sedentary time and mortality, independent of time spent performing moderate-to-vigorous PA (MVPA) (Koster et al., 2012). Notwithstanding, only 65% of UK men and 61% of UK women achieved 150 mins/week MVPA in 2018 (Sport England, 2019), whilst 24% of men and 26% of women were inactive (<30 mins/week MVPA) (Sport England, 2019). Moreover, PA prevalence is significantly associated with age and health status, with older adults and those living with long-term health conditions among the least active (Sport England, 2019). Future development or modification of PA intervention programmes has the capacity to improve UK public health.

In 2018, the number of adults aged 65+ years in Great Britain accounted for 18% (11.9 million) of the total population. By 2050, this number is projected to increase to 24.8% (17.7 million) (ONS, 2019). 'Healthy ageing' is defined as 'the process of developing and maintaining the functional ability that enables well-being in older age' (WHO, 2015: p.28). An aging population that is able to function to contribute towards society, e.g., in a work-related capacity, is desirable. However, an ageing population that is living longer, but experiencing more years in poor health and reliance on healthcare services may be problematic for economic sustainability (WHO, 2015). PA is integral to healthy ageing and is propagated as a cost-effective means to delay functional declines in later life and compress morbidity. Those who are more physically active are more likely to experience better physical and psychological health, as well as overall better quality of life (Lachman et al., 2018). Notwithstanding, Active Lives Survey data (Sport England, 2019) suggest many adults aged ≥75 years do not meet PA guidelines. Moreover, 49% of those aged 75+ years are inactive (Sport England, 2019).

Adults aged ≥65 years face increased risk of developing noncommunicable diseases (NCDs), such as, CVD, chronic respiratory diseases, cancers and diabetes. NCDs accounted for 89% of all mortality in the UK in 2016 (WHO, 2018). Physical inactivity represents a key modifiable risk factor for the development of NCDs (WHO, 2015), can facilitate health-enhancing benefits in individuals with existing NCDs (Billinger et al., 2014; Irwin et al., 2017), and reduces the risk of multi-morbidity, i.e., co-occurrence of two or more chronic medical conditions (e.g., NCDs). Among stroke survivors, PA is associated with improved functional capacity and overall quality of life, as well as risk reduction for further cardiometabolic events (Billinger et al., 2014; Dunn et al., 2017). Similarly, PA is associated with reduced risk for cardiovascular-related mortality and overall quality of life for those with CVD (Darden, Richardson, & Jackson; 2013; Anderson et al., 2016). Active Lives Survey data (2019)

combine disability and long-term health conditions (including NCDs), demonstrating only 46% of adults with a disability or long-term health condition achieve PA guidelines (41% inactive). Only 38% of adults with 3 or more disabilities and/or long-term health conditions met PA guidelines (49% inactive).

There exists a substantial detrimental economic impact of treating physical inactivity related NCDs, estimated to be £7.42bn a year in direct costs to the National Health Service (NHS) and indirect costs to wider UK society (Centre for Economics and Business Research, 2015; Scarborough et al., 2011). Hence, PA interventions present a key opportunity to lessen undue economic burden and reduce strain on the NHS. The primary pursuit of public health research is to assist in the design, implementation, and evaluation of structured PA interventions. PA interventions have been developed and implemented for older adults (Hobbs, et al., 2013; Müller & Khoo, 2014; Zubala et al., 2017), overweight/obese individuals (Dodd et al., 2014; Herring et al., 2017), and the socioeconomically deprived (Hardcastle et al., 2012; Bull et al., 2014). Age, weight status and socioeconomic deprivation represent three factors that may influence the development and effectiveness of PA interventions. Moreover, there exists an abundance of modifiable intervention characteristics that may influence the effectiveness of PA interventions. These include intervention duration, setting (home-based *vs*. clinical *vs.* outdoor), delivery format (group *vs.* non-group based, or face-to-face *vs* remote delivery) and content (walking *vs.* strength building *vs.* falls prevention) (Balis et al., 2018). Further, demographic characteristics of participants, such as experiences of specific NCDs, may influence PA intervention content and effectiveness. That is, an effective PA intervention for those with CVD may require substantial adaptation for use by those with poor respiratory health. Overall, PA interventions for adults and older adults are generally effective (Zubala et

al., 2017; Balis et al., 2018; Howlett et al., 2019), however, there remains a lack of clarity regarding superior intervention characteristics (Zubala et al., 2017).

Exercise referral schemes

Exercise referral schemes (ERSs) represent a popular form of PA intervention for insufficiently active adults with physical and/or psychological health conditions (NICE, 2014). ERSs are typically delivered free of charge, or at discounted rates, over an 8 to12-week period (Williams et al., 2007). Scheme length, content, and eligibility criteria may vary (Pavey et al., 2011), though delivery primarily involves structured gym-based activities. Schemes may also offer swimming, walking, or gardening activities at their own discretion (Gidlow et al., 2016). ERSs are predominantly accessed by those aged ≥55 years with one or more long-term health condition(s) (Hanson et al., 2013; Wade et al., 2020). Thus, ERSs represent targeted interventions for populations known to have poor levels of PA engagement. Since their development in the 1990s, ERSs have become a prevalent PA intervention in the UK and beyond (Pavey et al., 2011). However, there remains a lack of evidence to support the effectiveness and cost-effectiveness of ERSs (Pavey et al., 2011; Campbell et al., 2015). Known factors to impact ERS effectiveness include poor rates of uptake and completion (Campbell et al., 2015), as well as inter and intra-scheme heterogeneity (Henderson et al., 2018). More recently, research has focussed on developing understanding of why some individuals appear to benefit from ERS participation, whilst others do not (Parretti et al., 2017; Hanson et al., 2019). Identification of facilitators and barriers to ERS completion and/or identification of discrete sub-populations for which ERSs facilitate health-related improvements enables ERSs to be modified in a manner that improves effectiveness and cost-effectiveness.

Active West Lancs

The sociodemographic context of West Lancashire

The borough of West Lancashire covers 38,109 hectares, with an estimated population of 113,831 (Office for National statistics: ONS, 2017). The most recent census data reported 95.6% of residents identified as White British, compared to the national average of 85.5%. (ONS, 2011). Life expectancy at birth for males and females is 79.4 and 82.2 years, respectively. This is slightly lower than the national averages of 79.6 years for males and 83.2 years for females (Public Health England, PHE: 2019). According to national socioeconomic deprivation estimates, West Lancashire ranked 178th most deprived of 317 districts and unitary authorities (Index of Multiple Deprivation, IMD: 2019). Health inequalities are rife across the different main settlements of Burscough, Ormskirk, and Skelmersdale. Deprivation and unemployment are highest in Skelmersdale, where 5 of the 7 wards rank within the 20% most deprived areas in the UK, and 4 within the national 5%. The life expectancy gap for the most deprived areas of West Lancashire is 9.5 years lower compared to the least deprived areas (PHE, 2019). In comparison, the national life expectancy gap for males and females is 8.6 years and 7.9 years respectively (PHE, 2019). PA levels of West Lancashire adults (70.6%) compare favourably to regional (North West = 64.7%) and national (66.3%) averages. However, there is an opposite trend for weight status with 69.5% classified as overweight or obese compared to regional and national averages of 64.3% and 62%, respectively (PHE, 2019). Positively, this figure reduced to 64.9% in 2019 to fall closer in line with regional and national averages (PHE, 2019). In an attempt to combat poor health, Lancashire County Council announced funding for Active West Lancs in 2015. As described by funders and commissioners, the concept of Active West Lancs was ‘to engage people into healthier lifestyles through exercise and healthy eating.’ The scheme targeted different sections of the community by utilising a ‘range of council

assets', such as leisure centres, community buildings, and open spaces in a concerted effort to reduce obesity and improve psychological well-being.

Background to Active West Lancs

Active West Lancs encompassed a host of healthy lifestyle interventions designed to facilitate weight reduction in West Lancashire residents. West Lancashire Borough Council (WLBC) and associated external partners were awarded £173,119 per annum in April 2016 to deliver the scheme on a 3-year (+1/+1) contract. West Lancs School Sport Partnership received £57,000 p.a. to engage children and young people, West Lancs Community Voluntary Service received £17,000 p.a. to provide social media, marketing and access to community allotments, and West Lancs Community Leisure Trust received £61,000 per annum to deliver exercise referral. Active West Lancs comprised a holistic assortment of healthy lifestyle programmes, of which the ERS represented the most prominent central feature. The remainder of the funding was divided between internal staffing (e.g., administrative) and miscellaneous costs. Inclusive of all Active West Lancs initiatives, projected community engagement figures were 23,480 participants over a 3-year period. Engagement figures for weight management and PA over the same time-period were 5,870 for early prevention and 5,870 for prevention and targeted community interventions.

Active West Lanc's exercise referral scheme

The contract stipulated Active West Lanc's exercise referral scheme (AWL) to be provided free of charge for a duration of 12-weeks. The mandated key performance indicators (KPI) were to reduce body mass index (BMI) and increase PA. Success was conceptualised as the number of participants achieving a 3% or 5% BMI reduction at 12-weeks and 12-month follow-up. PA change was also assessed at 6-weeks, 12-weeks and 12-months, though any PA

increase was considered a success, with no stipulated targets in respect of desired PA volume. In late 2017, Lancashire County Council mandated the introduction of the short Warwick Edinburgh Mental Well-being scale (SWEMWBS) within existing data collection procedure. Improved post-scheme well-being (i.e., higher SWEMWBS scores) indicated success. Eligible referral pathways to AWL included general practitioners (GP), NHS services including specialist cancer and maternity services, weight management services, mental health services and the community volunteer service. Further, individuals were able to self-refer to AWL. The original contract did not include the stipulation that self-referrals must be permitted, nor did it prohibit the ability to access the scheme via self-referral. Individuals must be 18+ to be eligible for AWL. Participants were not allowed to have held gym membership at any AWL facility within the previous 6-months prior to enrolment. Similarly, participants were not permitted to the scheme if they had previously completed AWL within the past 2 years. Again, these stipulations were not specifically mandated within the original contract and were decided upon by WLBC and their commercial partners. The original contract did stipulate that AWL should only be made available for participants with a BMI between 25 kg/m^2 and $35kg/m^2$. However, participants with BMI values above and below this threshold were still admitted to AWL, though participant data were not included as part of internal reporting figures. In line with NICE (2014) guidance, only those with underlying medical conditions were eligible to take part in AWL.

Medical inclusion/exclusion criteria

AWL inclusion criteria included CVD (e.g., myocardial infarction, stroke and angina), diabetes, respiratory disorders (e.g., chronic obstructive pulmonary disorder (COPD) and asthma), cancer, musculoskeletal disorders, mental health conditions (e.g., mild-to-moderate anxiety and/or depression). Significant risk factors, such as high blood pressure (BP), high

cholesterol and obesity were additional inclusion criteria. Participants were classified as 'other' if they reported health-related conditions that were not appropriately represented by these categories. Exclusion criteria were as follows: absence of an underlying health condition, pregnancy, unstable or uncontrolled CVD (e.g., angina), uncontrolled asthma, hypertension (BP above 180/100mmHg) and hypotension (BP below 100/60mmHg).

Staff structure

AWL consisted of a full-time office-based operational programme manager who oversaw the running of the scheme, as well as a part-time office-based project support officer responsible for co-ordinating referrals and organising appointments. AWL employed three full-time exercise referral officers (EROs), with a designated lead officer assuming additional administrative and managerial responsibilities. The scheme also employed one part-time ERO. All EROs held a minimum of Level 3 Register of Exercise Professionals qualification in GP referral. Three officers also shared Level 4 qualification in a variety of specialist areas including falls prevention, stroke, cancer, diabetes, mental health and cardiac rehabilitation. Four separate leisure sites located within Banks, Burscough, Ormskirk, and Skelmersdale delivered AWL. Full-time EROs were stationed at the Ormskirk and Skelmersdale sites, with the part-time officer stationed at the Burscough site. The lead ERO divided their time across all sites proportionate to weekly demand, as well as attending the Banks site once per week.

Referral process

All referrals went through a central office where the operational AWL manager and project support officer were based. Primary and/or secondary care referrers forwarded a completed referral form to the main AWL office via email or fax. Self-referrals registered their interest in AWL via email or telephone to the central office. The project support officer would

then attempt to contact referrals to confirm eligibility and arrange an assessment appointment with an ERO at client's preferred leisure site. At this time, participants were also provisionally scheduled in for a 12-week assessment appointment. The initial one-to-one assessment appointment lasted 30-minutes duration and included discussion of the participants underlying health condition(s) and health-related goals. Additionally, participants had their height (cm), weight (kg) and BP (mmHg) measured and were asked to complete a baseline questionnaire to assess current PA levels. Using this measure, participants were asked to circle the most appropriate response to reflect their PA frequency (mins/week) over the past 7 days. Response options were '0-30', '30-60', '60-90', '90-120', 120-150', or '150+', with no specification of PA type (i.e., domestic or leisure) or intensity (i.e., moderate or vigorous intensity). At the end of the assessment appointment, participants were asked to sign a client agreement that stipulated they would comply with the requirements of AWL. This included notifying EROs if they felt unwell during exercise and/or of changes in medications, medical conditions or deterioration of medical status. Successful completion of the initial assessment appointment confirmed enrolment to AWL.

All enrolled participants undertook a full gym induction where EROs provided detailed instruction and demonstrations of how to use the available exercise apparatus safely. Available exercise apparatus varied across the different leisure sites, though all included a selection of cardiovascular machines (e.g., treadmills, exercise bikes and cross-trainers) and resistance-based training apparatus (e.g., free-weights, barbells and weight machines). EROs also used inductions to develop bespoke training programmes based on participant's physical capabilities and goals. Following a successful induction, participants were admitted to the scheme on a Tier One membership. Tier One membership granted access to leisure site facilities during supervised session times only. Supervised sessions were drop-in sessions overseen by EROs at

various times throughout the week (see appendix A for the supervised session timetable). Supervised sessions did not explicitly consist of one-to-one or group-based provision. Instead, EROs were stationed within the gym attending to the various needs attending AWL participants on a demand-driven basis. Sessions typically lasted for a duration of 2 hours and were predominantly scheduled on weekdays during mid-mornings and early afternoons. Evening sessions were available once per week to accommodate those unable to attend during usual business hours at the Burscough, Ormskirk, and Skelmersdale sites only. There were no supervised sessions on weekend days at any site. Once EROs deemed participants to be safe and competent gym users, they could be promoted to Tier Two membership. Tier Two membership enabled participants to access AWL outside of supervised sessions in accordance with site-specific gym opening times, however, they were still actively encouraged to 'check-in' with EROs at least once per week. All AWL participants also had free access to the variety of intermittent health-related activities offered under the wider programme banner, including Nordic walking, line dancing, tai-chi and walking football. Participants were also permitted access to a free 12-week classroom-based nutritional course.

Follow-up assessment appointments were completed at week 12. Week 12 appointments included re-measurement of weight and BP and completion of the PA measure and SWEMWBS to assess changes in PA volume and well-being. Participants were discharged following completion of their 12-week assessment appointment and offered the opportunity to take up a discounted 6-month gym membership for an upfront one-off cost of £70. After 6 months, gym memberships reverted to usual prices on a rolling month-by month payment basis. Prices varied across the different leisure sites, ranging from £18.99 to £23.99 per month. All participants were sent a 12-month follow up self-report questionnaire to assess satisfaction with the scheme and current PA levels. See Figure 1 (below) for full details of the referral pathway.

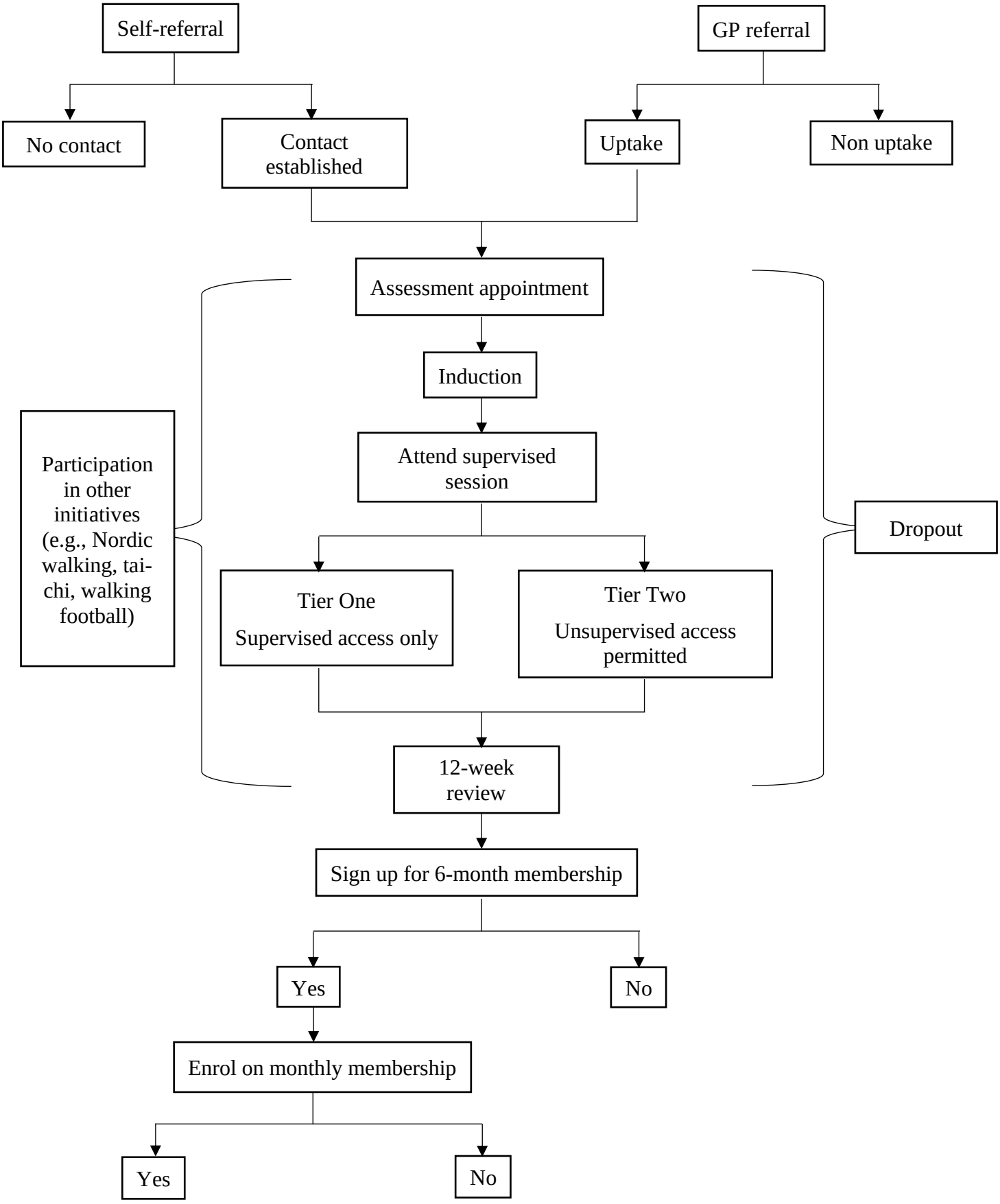

Figure 1. Active West Lanc's exercise referral scheme pathway.

Aims and objectives

This thesis comprises the exploration and intervention development of a social-identity-informed intervention to enhance the effectiveness of Active West Lancs ERS (AWL). The social identity approach posits a subjective sense of social identification as the primary psychological mechanism underpinning the receipt and provision of social support, which is a primary facilitator of ERS completion. The adoption of a social identity approach will aid understanding of how to promote quality social support opportunities within ERSs. This, in turn, can improve the effectiveness of ERSs via increased rates of completion, thus increasing the likelihood that ERS participants achieve positive physical, behavioural and/or well-being outcomes. The thesis had two fundamental objectives, each comprising associated research questions to be addressed as follows:

1) To develop in-depth contextual understanding of AWL via a mixed method needs analysis.

    RQ1. Who accessed AWL and who was most likely to complete?

    RQ2. Was AWL completion associated with improvements in physical and/or psychological health?

    RQ3. What were the main facilitators and barriers to AWL completion?

    RQ4. What was the basis for social behaviour within AWL?

2) To develop, implement, and evaluate a contextually bespoke social-identity-informed intervention designed to enhance AWL effectiveness

    RQ5. What did AWL participants and providers perceive as salient characteristics to influence the prospective success of the intervention?

    RQ6. To what extent did AWL participants and providers perceive the intervention to be acceptable and contextually appropriate?

RQ7. To what extent did the intervention enhance participant and providers AWL experiences?

Structure of the thesis

This thesis comprises nine chapters and five original empirical studies. This first chapter outlined the public health need for PA intervention, provided a background to ERSs and detailed the overarching AWL scheme and thesis structure. Chapter two presents an in-depth literature review of the origins and development of ERSs across the UK. It provides a detailed breakdown of the evolution of ERS policy and changes in research direction over the last 3 decades. Further, it highlights prominent considerations regarding theory-based ERSs and practical limitations of ERS evaluations and current guidance. Chapter three outlines the methodological approach adopted throughout this thesis. This includes discussion of underlying philosophical assumptions of the thesis and specifies the quantitative and qualitative data collection and analysis methods used throughout. The empirical studies are presented in a two-phase structure (see Figure 2 below). Chapter four presents data on AWL participant rates of uptake and completion. Further, it contains exploration of the demographic patterning of AWL participant uptake and completion according to age, sex, health status and socioeconomic deprivation. Chapter five investigates the physical, behavioural, and well-being outcomes associated with AWL completion, as well as the extent to which outcomes vary according to participant health status. Chapter six offers an in-depth qualitative exploration of perceived facilitators and barriers to AWL completion from the perspectives of those who had previously completed the scheme. Additionally, participants provide insight on the social processes operating within AWL and preferred forms of social support. Chapter seven presents the perspectives of AWL participants and providers to document the co-development of a bespoke, social-identity-informed peer support intervention for the AWL context. Chapter

eight presents acceptability findings from the resulting intervention from the perspectives of participants, providers and peers, including recommendations on how the intervention can be further enhanced for future implementation. See Figure 3 below for the data collection timeline for each study. Lastly, chapter nine synthesises the findings from the five empirical studies, drawing together the thesis as a whole. Recommendations for practice are presented to inform ERSs and comparable public health PA interventions, alongside pragmatic and conceptual considerations for future research.

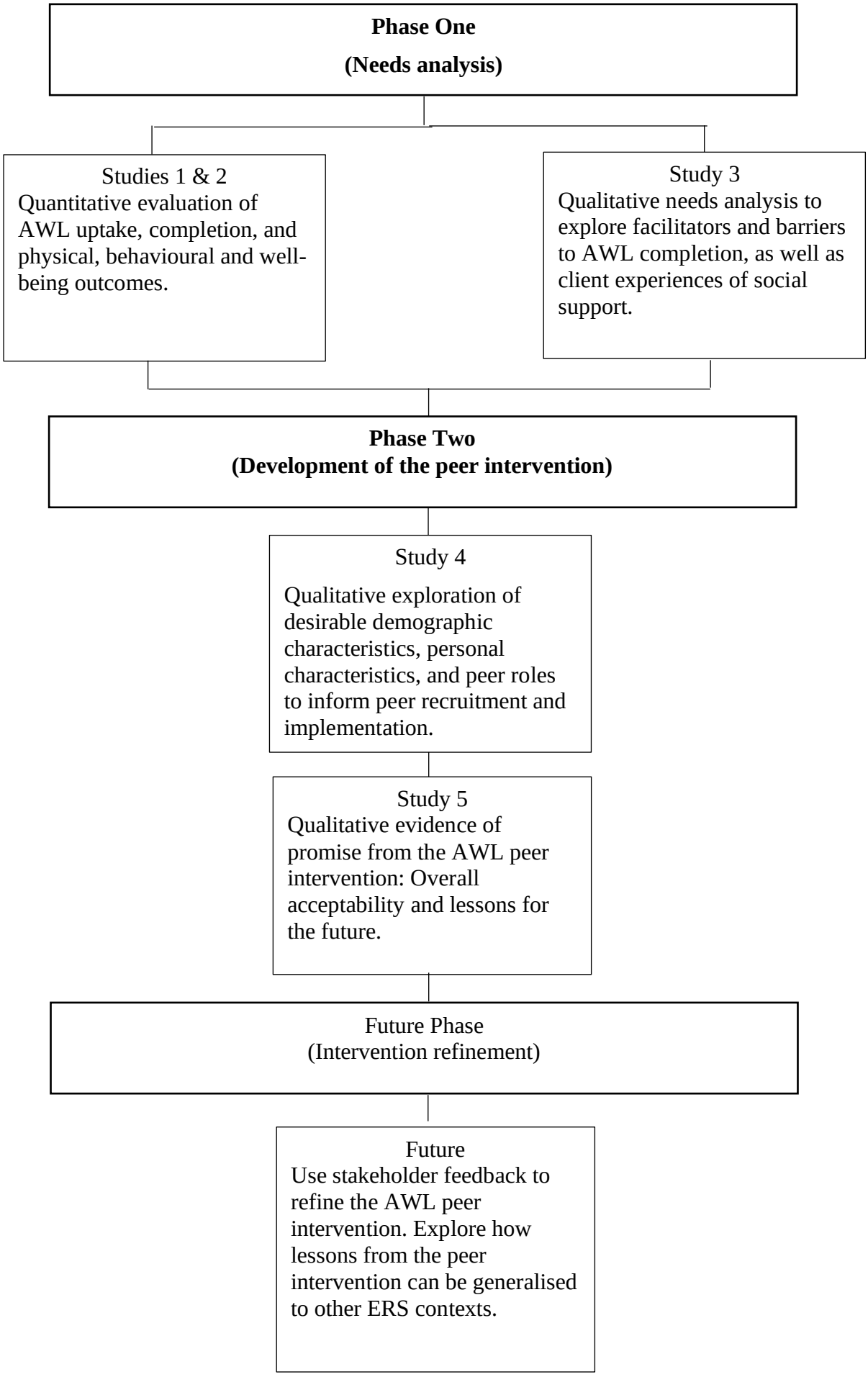

Figure 2. Overview of the phases of the thesis including specific study aims.

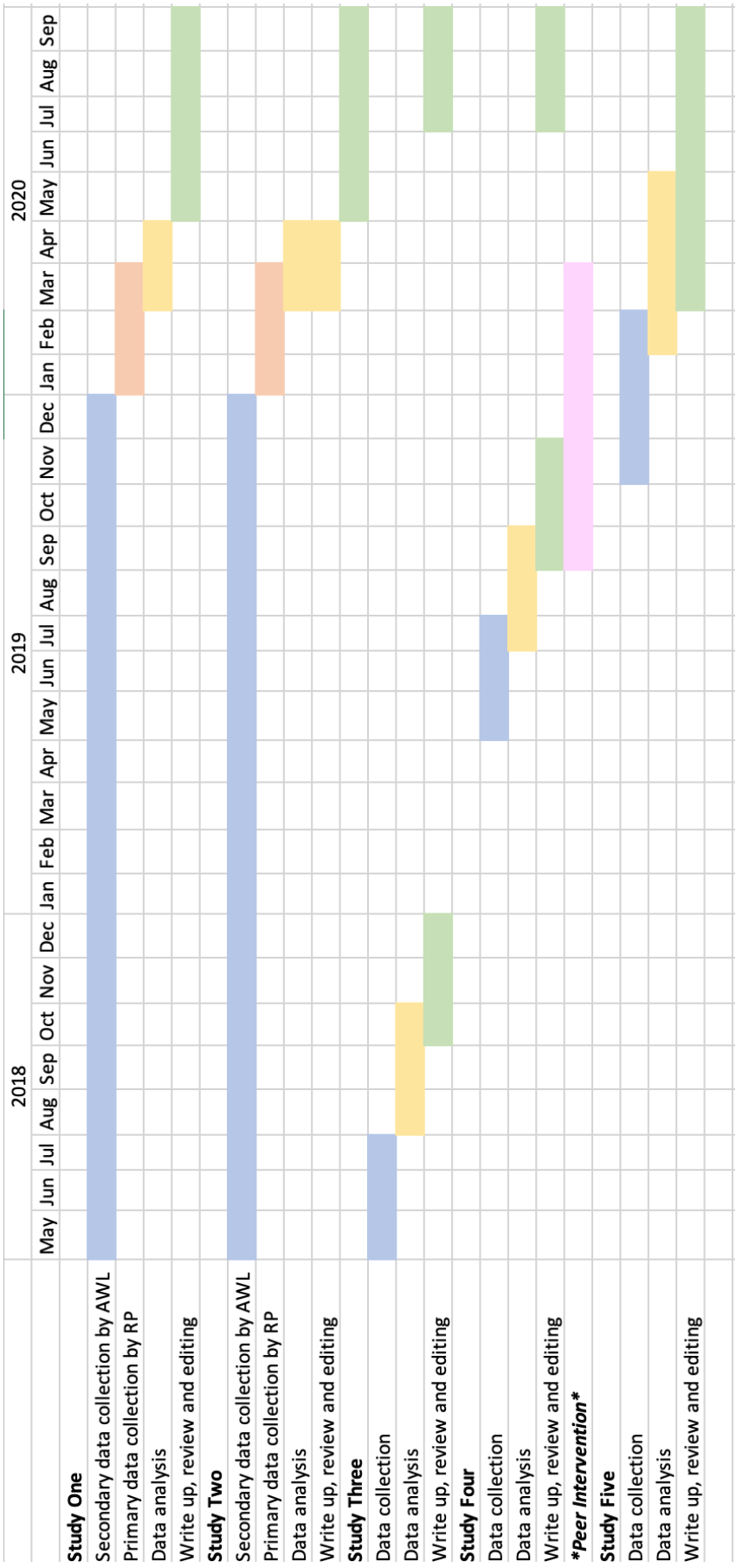

Figure 3. Thesis data collection timeline.

Chapter 2: Literature Review

Physical activity and sedentary behaviour – definitions

Physical activity (PA) is defined as "any bodily movement produced by skeletal muscles that results in energy expenditure" (Caspersen, Powell, & Christenson, 1985, p. 126). Every individual engages in PA in order to sustain life, with PA levels varying from person to person and over time. At its simplest, total daily or weekly PA may be categorized according to the sum of PA performed at work and at leisure, though leisure-time PA can be further divided according to time spent playing sports or performing conditioning exercises or household tasks (Caspersen et al., 1985). Notwithstanding, PA is a complex multidimensional behaviour that may also include activities other than those presented above. In response, it has become common to categorise PA according to the intensity of the activity performed. Consistent with the definition of PA, distinct PA intensities can be identified by the magnitude of required energy expenditure relative to being at rest. At rest, an individual typically expends an equivalent caloric expenditure of 1kcal/kg/hour relative to their basal metabolic rate, measured as one MET. In comparison, light, moderate, and vigorous PA requires much higher caloric consumption rates of <3 METs, 3 - <6 METs, and 6≥ METs, respectively (Ainsworth et al., 2000). Using these absolute intensity thresholds, PA levels represent the sum of time spent performing light, moderate and vigorous PA over a defined period. Sedentary behaviour (SB) is defined as "any waking behaviour characterized by an energy expenditure ≤1.5 METs while in a sitting or reclining posture" (Sedentary behaviour Research Network (2012, p.540). SB is therefore recognised as being a collection of behaviours that are distinct from PA, and when undertaken over prolong periods SB is negatively associated with health (Koster et al., 2012).

Exercise and health-related fitness

Exercise refers specifically to PA that is planned, structured, repetitive and purposive in the pursuit of maintaining or improving health-related physical fitness (Caspersen et al., 1985). Cardiorespiratory endurance, muscular endurance, muscular strength, body composition, and flexibility are principal facets of physical fitness. Levels of physical fitness vary on an inter and intra-individual basis, where one person may possess greater physical fitness than another or greater cardiorespiratory endurance relative to muscular strength (Caspersen et al., 1985). PA and exercise are terms that are used synonymously, though the planned and purposive aspect of exercise is likely to enhance the accruement or maintenance of physical fitness (Caspersen et al., 1985).

Physical activity and health

There is uncritical acceptance of the importance of PA for maintaining good physical and psychological health (Lee et al., 2012). To date, there exists an extensive body of evidence demonstrating an inverse relationship between PA and mortality, as well as the development of NCDs (McKinney et al., 2016). Positively, greater PA volume is associated with greater health-enhancing benefits (McKinney et al., 2016). Unequivocally, a physically active lifestyle is linked to reduced mortality and contributes to the prevention of diabetes, stroke, hypertension, and some cancers (Lee et al., 2012). Further benefits include enhanced cognitive and psychosocial functioning (McKinney et al., 2016). UK and global PA guidelines recommend 150 minutes of moderate-to-vigorous physical activity (MVPA) per week to accrue health enhancing PA benefits (WHO, 2018; DHSC, 2019). Identification and propagation of this recommendation facilitates surveillance of PA trends and prevalence rates worldwide. Alarmingly, global PA levels are much lower than in recent decades (Ng & Popkin, 2012). Ng and Popkin (2012) identified a 20% decline in PA levels between 1961 and 2005 in the UK. This downward PA trend is linked to technological advancements in occupational and

domestic settings, a proliferation of motor vehicle usage, and a surge in television viewing (Ng & Popkin, 2012). The most recent available evidence demonstrates global physical inactivity levels remained stable between 2001 – 2016 (Guthold et al., 2018). However, the physical inactivity rate of 27.5% in 2016 still equates to more than 1.4bn adults who are at increased risk of developing or exacerbating NCDs linked to physical inactivity (Guthold et al., 2018). Current Active Lives Survey data reflect comparable rates of physical inactivity among UK adults (Sport England, 2019). Globally, physical inactivity presents the fourth leading risk factor for mortality (WHO, 2009). Positively, the greatest PA-related reduction in all-cause mortality occurs among the least fit and next-to least fit groups (Myers et al., 2004), with slight PA increases in these groups associated with meaningful health improvements (McKinney et al., 2016). Thus, there exists a preeminent emphasis on increasing PA among the least physically active.

Physical activity interventions

Adult PA interventions have been employed within a variety of workplace (McEachan et al., 2011; Corbett et al., 2018; Krebs et al., 2020), clinical rehabilitation (Mesquita et al., 2017; Hoeve et al., 2018; Wurst et al., 2019), and community-based settings (Beauchamp et al., 2018; Wade et al., 2018; Garner-Purkis et al., 2020). Reviews indicate that workplace PA interventions can improve cardiorespiratory fitness (Burn et al., 2019) and psychological well-being (Abdin et al., 2018). Though overall, there remains insufficient evidence to support the effectiveness of workplace interventions for increasing PA (McEachen et al., 2011; Malik, Blake & Suggs, 2014; Freak-Poli et al., 2020). Interestingly, of 58 PA interventions included in Malik et al. (2014), only 6 incorporated an actual PA component (e.g., walking), with others focussing on changing intentions to exercise outside of working hours. In clinical rehabilitation contexts, PA interventions during cardiac rehabilitation are associated with increased PA

(Dibben et al., 2018; Meiring et al., 2020) and reduced SB (Meiring et al., 2020). Though, interventions in COPD rehabilitation contexts have modest and variable effectiveness (Mesquita et al., 2017). Moreover, the effectiveness of community-based PA interventions is inconclusive (Everson-Hock et al., 2013; Craike et al., 2018). Taken collectively, the null review findings across workplace and community-based PA interventions reflect high sensitivity to the vast heterogeneity of individual intervention characteristics (Malik et al., 2014). As highlighted by Malik et al. (2014), for every successful workplace PA intervention, others demonstrated null findings or comparable control group findings. Thus, the description of such PA interventions as having 'inconclusive' effectiveness rather reflects a significant knowledge-gap regarding why some interventions are effective and others are not. Accordingly, behaviour change research has sought to identify common components of effective interventions. To this end, incorporation of social support (Greaves et al., 2011; Nyman, Adamczewska, & Howlett, 2018), goal setting (Samdal et al., 2017; Nyman et al., 2018), and self-monitoring of behaviour (Bird et al., 2013; Samdal et al., 2017) are positively associated with PA intervention effectiveness across a variety of workplace, rehabilitation and community-based settings.

Further, salient participant demographic and personal characteristics can influence the effectiveness of PA interventions. Alongside age and health status, PA levels vary according to socioeconomic deprivation (Sport England, 2019). Those in managerial, administrative and professional occupations are more likely to meet PA guidelines (72%) and less likely to be inactive (16%), than those in routine/semi routine jobs and long term-unemployment (54% active and 33% inactive, respectively; Sport England, 2019). There are a multitude of interacting social, economic and ecological factors that combine to create PA inequalities. For instance, lack of time has been recognised as a prominent PA barrier for those with high or low

incomes (Kalenkoski & Hamrick, 2013; Borodulin et al., 2016), with long hours spent in care, travel or work negatively associated with PA (Spinney & Millward, 2010). However, the specific contextual factors for why individuals are time poor may differ among high- and low-income households. Lower household income is associated with significantly lower self-reported leisure-time PA (Kari et al., 2015), as well as higher BMI, higher prevalence of overweight and obesity, and overall low self-rated health (Schule & Bolte, 2015). Both lack of time and income are independently associated with physical inactivity (Venn & Strazdins, 2017), though for more than 1 in 10 these factors interact to increase risk of inactivity (Venn & Strazdins, 2017). The above example of socioeconomic deprivation illustrates the inherent complexity in attempting to develop and implement successful large-scale PA interventions. Consequently, the inconclusive evidence for the effectiveness of workplace and community-based PA interventions may also reflect variable effectiveness among specific sub-populations in relation to age, health status, and socioeconomic deprivation.

Exercise referral schemes

ERSs represent a particular form of PA intervention to originate and proliferate in the UK in the early 1990s (Fox et al., 1997). Rapid expansion of ERSs occurred in lieu of a standardised framework (Crone et al., 2004), or an established evidence base to support their effectiveness (Dugdill et al., 2005). Fox et al. (1997) estimated 200 ERSs were operational or planning to be operational in April 1994. Fox et al. (1997) raised concerns that ERSs were inadequately resourced to enable long-term evaluation of short- and long-term impact, precluding the ability to estimate cost-effectiveness. Notwithstanding, public demand for ERSs remained high, with adherence and completion rates estimated between 60% - 70%. Demonstrating the ability for ERSs to recruit physically inactive individuals (Fox et al., 1997). RCTs conducted by Stevens et al. (1998) and Taylor et al. (1998) reported uptake of 35% and 87%, respectively. Completion rates ranged from 25% (Stevens et al., 1998) to 41% (28%

attended at least 75% of sessions) (Taylor et al., 1998), with Stevens et al. (1998) attributing low uptake and completion rates to the use of an unconventional letter-based recruitment strategy. Of those who attended an initial ERS consultation, 72% attended a second consultation at scheme exit (Stevens et al., 1998). Stevens et al. (1998) and Taylor et al. (1998) reported increased PA, with Taylor et al. (1998) reporting reduction of sum of skinfolds, as well as long-term reduction of systolic blood pressure (SBP) for high adherers. Stevens et al. (1998) attributed low cost-effectiveness estimates to poor uptake, proposing cost effectiveness to be enhanced among better attended ERSs. Taylor et al. (1998) cautioned of a complex interaction between adherence and cost-effectiveness. Smaller schemes may offer individualised support which promote ERS adherence and completion, however, there are negative implications for per patient cost and public health impact (Taylor et al., 1998). Fox et al. (1997) estimated ERSs had the capacity to positively impact less than 1% of population health. Nonetheless, ERSs were endorsed by the government as cost-effective alternatives to long-term prescription of medicine (DoH, 1999; Dugdill et al., 2005).

ERS Policy

Fox et al. (1997) highlighted heterogeneity of ERSs in relation to delivery format and setting. In response, the National Quality Assurance Framework for ERS (NQAF: DoH, 2001) provided guidance to promote best-practice exercise referral. NQAF included recommendations for recruitment, evaluation and long-term follow up, though was not intended to be used as a strict blueprint for how ERSs must be commissioned, structured or managed (DoH, 2001). Accordingly, NQAF afforded ERS commissioners, referrers and providers flexibility to tailor schemes to accommodate specific contextual needs. Contextual awareness of the socio-environment is essential for the development of successful ERSs (Moore et al., 2015). However, this approach rendered NQAF guidance sensitive to

interpretation, with particular ambiguity surrounding best practice evaluation methods (Dugdill et al., 2005). Morgan's (2005) subsequent review highlighted the complexity of evaluating ERSs due to heterogenous implementation and evaluation practices, which inhibit the development of a robust evidence base.

In 2006, the National Institute for Health and Care Excellence (NICE) published 'Four commonly used methods to increase physical activity', a brief guidance document which included recommendations for ERSs. NICE (2006) concluded there was insufficient evidence to support ERS efficacy and that ERSs should only be commissioned if part of a properly designed and controlled research study to determine effectiveness. However, NICE (2006) guidance was nullified by subsequent DoH (2007) clarificationthat ERSs only needed to be part of a controlled study if solely targeted at those without underlying medical conditions. Sowden and Raine (2008) highlighted the inherent contradiction of DoH's (2007) statement as access to ERSs exclusively relied on the presence of an underlying medical condition. Such conflicting policy advice facilitated the continued proliferation of ERSs despite an existing equivocal evidence base (Sowden & Raine, 2008). In 2010, the British Heart Foundation National Centre for Physical Activity and Health published, 'A Tool Kit for the Design, Implementation & Evaluation of Exercise Referral Schemes'. The toolkit represented a companion piece to NQAF (2001) and presented more in-depth guidance for ERS evaluation, including recommendations for evaluation design and suitable outcome measures. However, the toolkit has been criticised as a missed opportunity for promoting greater standardisation and comparability of ERS evaluations due to the inability to endorse specific validated tools for outcome measures (Hanson, 2017 [Unpublished thesis]). Notwithstanding, the toolkit included a census of ERSs operating in England and Scotland (British Heart Foundation National Centre for Physical Activity and Health, 2010). One-hundred and fifty-eight ERSs

were identified at a response rate of 64%. Contemporary evidence demonstrates 17 published ERS evaluations between Edmunds, Ntoumanis, and Duda (2007) and Duda and colleagues (2014). Thus, despite NICE (2006) guidance, less than 10% of ERSs were subject to robust evaluation. Pavey and colleagues' (2011) later estimate of 600 operational UK-based ERSs may even suggest that this figure represents a significant underapproximation.

NICE published updated ERS guidance in 2014, restating the lack of evidence for effectiveness and cost-effectiveness and the recommendation that schemes should only be commissioned as part of well-designed trials. NICE (2014) defined ERSs as including; (i) assessment involving primary care or an allied health professional to determine that someone is sedentary or inactive, that is, not meeting current recommended PA guidelines, (ii) referral by primary care or an allied health professional to a PA specialist or service, (iii) personal assessment by a PA specialist to determine what PA programme to recommend for their specific needs, and (iv) opportunity to participate in a PA programme. ERSs were recommended to collect data in line with the 'essential criteria' outlined in the standard evaluation framework (SEF: Cavill, Roberts, & Rutter, 2012). Specifically, this included programme details, evaluation details, demographics of individuals, baseline and one-year follow up data, and process evaluation (NICE, 2014). ERS data should also be made available for analysis, monitoring, research to improve future practice (NICE, 2014). Adoption of SEF for the development and evaluation of ERSs was intended to enable the development of a robust, quality evidence base. However, Hanson and Jones (2017), demonstrate heterogeneity in the interpretations of SEF among different commissioners, suggesting comparisons of ERS evaluations remain hindered by poor compatibility of design and evaluation characteristics. Moreover, lack of NICE (2014) endorsement for a specific validated tool for assessing PA may impede comparison of evaluations if inconsistent methodological approaches are implemented.

Notwithstanding, NICE (2014) highlighted the need to explore ERSs that vary by setting, intensity and duration, participant reason for referral and sociodemographic characteristics, as well, as other scheme characteristics, including design, content and delivery, and referral mechanisms. It was also acknowledged that cost-effectiveness modelling was unable to capture all the potential benefits of ERSs, such as increased social capitol and inactive or sedentary participants becoming physically active below the threshold of recommended guidelines.

NICE (2014) recommendations were formed on the basis of high-quality RCT and systematic review evidence. Robust evidence-based approaches are essential for evaluating and optimising public health interventions (Hanson & Jones, 2017), with RCTs representing 'gold-standard' evidence of an intervention's effectiveness (Moore et al., 2015). However, the use of RCTs in ERS evaluation has received criticism (Dugdill et al., 2005; Oliver et al., 2016). As defined by MRC guidance (Craig et al., 2008; Moore et al., 2015), ERSs are complex interventions comprising multiple interacting components to facilitate the desired outcome of increased PA. Implementation of restrictive standardised procedures is necessary in order to establish causality within complex interventions (Craig et al., 2008). Yet, this is incompatible with the heterogenous, dynamic context of ERSs, which are sensitive to a myriad of individual behavioural and social influences (Oliver et al., 2016). Sole focus on ERS effectiveness may also fail to develop understanding of why interventions are successful (Pawson et al., 2005). Though, this limitation can be addressed by combining RCT with thorough process evaluation (Murphy et al., 2012; Moore et al., 2013; Moore et al., 2015).

Sowden & colleagues (2008) suggest the feasibility of conducting ERS RCTs is limited by poor acceptability among referrers. In order to create randomised conditions, entry to ERSs may be deferred for some participants (Murphy et al., 2012). Eligibility for Murphy et al.

(2012) was coronary heart disease risk, mild to moderate depression, anxiety or stress, or both. However, eligible participants who declined to enter the RCT were subjected to a 12-month waiting list (Murphy et al., 2012), raising ethical considerations of limiting ERS access in individuals with underlying health conditions who may otherwise benefit. As part of an accompanying process evaluation, Din et al. (2015) confirmed some referrers were uncomfortable with the randomisation process and withheld referral until the RCT had finished so ERS access could be guaranteed. Notwithstanding, this did not prove to be a significant impediment to achieving recruitment targets in Murphy et al. (2012), suggesting the limitations are primarily ethical rather than practical. Further, RCTs are likely to yield findings with poor generalizability to 'real-world' ERS contexts (Dugdill et al., 2005). For instance, whilst Murphy et al.'s (2012) recruitment strategy targeted individuals with specific underlying health conditions, in common practice ERSs are widely accessible to participants with heterogenous health conditions. MRC recommends consideration of cost relative to potential benefit of conducting complex interventions (Craig et al., 2008). Given the lack of UK-based RCTs conducted post-Murphy et al. (2012), positive perceptions of the cost-benefit ratio can be considered to be low (Oliver et al., 2016). In such cases, quasi-experimental or observational methods may be appropriate (Craig et al., 2008). Whilst unable to provide the same reliable estimates of effect as RCTs, observational studies can enhance understanding of who engages in ERS, as well as sociodemographic patterns of uptake and completion (Hanson et al., 2013).

ERS evidence base

Positive physical outcomes can be achieved via ERS completion, such as short (Taylor et al., 1998; McGeechan et al., 2018) and long-term reduction of BMI, weight status and blood pressure (Mills et al., 2012; Duda et al., 2014; Prior et al., 2019). ERS completion facilitates a marginal short (Parretti et al., 2017; McGeechan et al., 2018; Rowley et al., 2019b) and long-

term PA increase (Pavey et al., 2011; Campbell et al., 2015; Prior et al., 2019), as well as enhanced short (Wade et al., 2020) and long-term well-being and health-related quality of life (HRQOL: Parretti et al., 2017; Prior et al., 2019). Enhanced well-being and HRQOL are associated with ERS-related access to supportive social networks of similar others (Moore et al., 2013; NICE, 2014) and perceived improvements in physical condition and health (Taylor & Fox, 2005; Queen, Crone, & Parker, 2015). However, positive physical, behavioural and well-being outcomes associated with ERS completion are equivocal (Williams et al., 2007; Pavey et al., 2011; Murphy et al., 2012) and, where reported, insufficient to meaningfully enhance health (Wade et al., 2020). NICE (2018) state that there is insufficient evidence to support the effectiveness and cost-effectiveness of ERS, relative to brief PA advice.

Notwithstanding, there are important caveats to be considered when appraising the potential contribution of ERSs to health. Cost-effectiveness estimates are negatively impacted by high rates of ERS dropout (Campbell et al., 2015), with approximately 50% of all ERS participants failing to complete (Pavey et al., 2011). Williams et al. (2007) reported the need to refer 17 participants to an ERS for one to achieve ≥90 – 150 mins/week of moderate PA (1:17). Prior et al. (2019) recently updated this figure to 1:11, though for every eight referrals, one went on to achieve long-term improvement in at least one health indicator. Due to dropout precluding post-ERS follow-up assessment, it must be assumed that no short or long-term health-related improvements are achieved by ERS dropouts, yet this may not be the reality. Further, due to the association between ERS completion and positive physical, behavioural and well-being outcomes (Mills et al., 2012; Duda et al., 2014; Prior et al., 2019), ERS cost-effectiveness can be improved by reducing dropout rates (Campbell et al., 2015). In response, research has explored facilitators and barriers to ERS completion (Hanson et al., 2013; Morgan et al., 2016; Kelly et al., 2017). There is a lack of consensus of sociodemographic

characteristics associated with ERS completion (Campbell et al., 2015), with increasing age the most consistent predictor. However, there is agreement that supportive and empathetic EROs, peer support, and perceived progress toward health-related goals are facilitators of ERS completion (Morgan et al., 2016). Prominent barriers to ERS completion include perceptions of an intimidating exercise environment, inconvenient scheduling of sessions, and perceived lack of ERO and/or peer support (Morgan et al., 2016). Despite enhanced understanding of factors associated with ERS completion, there is no evidence to support that dropout rates have been mitigated (Shore et al., 2019).

The ERS evidence base is also principally susceptible to extensive heterogeneity (Beck et al., 2016). ERS heterogeneity exists between schemes (Wade et al., 2020), among providers within the same ERS (Henderson et al., 2018), and among ERS participants in respect of age, sex, socioeconomic status and primary reason(s) for referral (Pavey et al., 2011; NICE, 2014). In this regard, an equivocal ERS evidence base is unsurprising. However, it may be derived that different iterations and interpretations of ERSs are variably successful for facilitating positive health-related outcomes (Beck et al., 2016). Some approaches to ERS may successfully facilitate positive physical, behavioural and/or well-being outcomes, whereas others may not. For instance, ERS duration typically lasts between 10-12 weeks (Pavey et al., 2011; Campbell et al., 2015), though longer length schemes (i.e., ≥20 weeks) are more effective for facilitating positive outcomes (Rowley et al., 2019). Longer length ERSs may better enable previously sedentary or inactive participants to safely build up and maintain PA to recommended levels which positively enhance health over time. Prior et al. (2019) reported a positive association between completion of a 6-month ERS and increased PA, reductions in BMI and systolic blood pressure, as well as enhanced well-being and HRQOL. Similarly, Mills and colleagues (2012) reported an increase in PA, as well as a reduction in weight and BP

following completion of a 26-week ERS. NICE (2014) recommend ERSs take place over a minimum 12-week period though there is no recommended upper limit for duration. Endorsement of ERSs ≥20 weeks may promote greater adoption among providers and improve effectiveness of ERSs (Rowley et al., 2019). Further, there is a lack of consistent reporting methods of ERS uptake, adherence, and completion (Shore et al., 2019). Positive health-related outcomes are more likely among high ERS adherers (Taylor et al., 1998), however, detailed ERS adherence behaviour is rarely reported alongside outcome evaluations (see Hanson et al., 2013 for an exception). Without standardised classification procedures, it is possible for some ERS participants to be classified as completers (Pavey et al., 2011), despite having only attended few ERS sessions alongside the final assessment at scheme exit (Shore et al., 2019). A lack of standardised evaluation and reporting procedures have contributed to a disjointed, equivocal ERS evidence base (Oliver et al., 2016), with unnecessary variation among preferred outcome measures (Hanson, 2017) and primary reason for referral classification. Recently, Hanson et al. (2020) advocated for a re-classification of ERSs as 'physical activity referral schemes' (PARS) and began development of a PARS taxonomy to aid classification and implementation of schemes. The reclassification of ERSs enables the inclusion of self-referral-based approaches which were not captured by NICE' (2014) initial definition. Hanson and colleagues (2020) recognise self-referral schemes as part of a 'myriad of innovations' to ERS practice and their inclusion allows comparison between 'traditional' and contemporary ERSs. The taxonomy presents a means to improve the evidence base and allow exploration of effectiveness among different iterations of ERSs.

NICE (2014) also suggest ERSs may be variably effective for facilitating positive health-related improvements according to age, sex, and primary reason for referral. ERSs are inclusive of adult participants of all ages, with different physical and functional capabilities, as

well as different ERS-related goals (Morgan et al., 2016; Oliver et al., 2016). Notwithstanding, ERSs are predominantly unilaterally appraised by the percentage of participants achieving increased PA, as well as BMI, weight and BP reduction (e.g., Williams et al., 2007; Pavey et al., 2011; Wade et al., 2020). Improper recognition of the multi-faceted conceptualisations of what constitutes 'success' among ERS participants (Mills et al., 2012) and providers (Henderson et al., 2018) may contribute to the equivocal evidence base. ERS completion is more likely to facilitate positive health-related outcomes for participants referred for select primary referral conditions (Murphy et al., 2012; Rowley et al., 2019). Those referred to ERSs due to CVD or CVD risk are more likely to complete ERSs (Campbell et al., 2015) and achieve positive health-related outcomes (Moore et al., 2013; Buckley et al., 2019). In contrast, those referred due to a mental health condition are more likely to dropout (Crone et al., 2008; Kelly et al., 2017) and completion is less likely to facilitate improved health (Moore et al., 2013). Differential ERS outcomes also occur as a function of BMI status (Parretti et al., 2017). Significant BMI reduction is more likely to be achieved among obese ERS participants, rather than those classified as overweight or normal weight (Parretti et al., 2017). Parretti et al's. (2017) findings may reflect different ERS-related goals among participants or that a 12-week ERS is only able to facilitate BMI significant BMI reduction among obese individuals. Collectively, these findings support Hanson et al's. (2019) assertion that a one-size-fits-all approach to evaluation is poorly representative of the potential wide-ranging benefits of ERS.

NICE (2014) recommendations led to the development of the National Referral Database (NRD) (Steele et al., 2019). NRD contains ERS data from 14 schemes across the UK allowing for large-scale analyses of ERS effectiveness (Wade et al., 2020; Rowley et al., 2019b). NRD may ultimately prove a valuable resource for identifying variable ERS effectiveness according to age, socioeconomic status, and primary reason for referral.

Identification of sub-populations for which ERSs are most effective can facilitate better targeting and recruitment strategies (Pavey et al., 2011). Further, it enables the implementation of better support strategies to mitigate dropout risk amongst groups with poor ERS completion rates. However, in its current format, the NRD is susceptible to the same limitations of heterogeneity that plague the ERS evidence base. NRD collates available data from a range of pre-existing ERSs with heterogenous delivery methods and capacity (Steele et al., 2019; Wade et al., 2020). Preliminary analyses of NRD have found a marginal positive association between ERS completion and physical, behavioural and well-being outcomes (Wade et al., 2020; Rowley et al., 2019b). Both Wade et al. (2020) and Rowley et al. (2019b) reported variable effectiveness of individual ERSs but were unable to determine what factors influenced effectiveness with the available data. Hence, NRD data provides robust evidence that ERS effectiveness varies among individual schemes. Identification and comprehension of active ingredients of known 'successful' ERSs can facilitate enhanced effectiveness and cost-effectiveness on a national scale.

Theory-based PA interventions

Medical Research Council (MRC) guidelines advocate for behaviour change interventions (BCIs) to draw upon ''the best available evidence and appropriate theory'' (Craig et al., 2008, p. 2). 'Behaviour' can be defined as: "Anything a person does in response to internal or external events. Actions may be overt (motor or verbal) and directly measurable, or covert (e.g., physiological responses) and only indirectly measurable" (Hobbs et al., 2011, cited in Michie & Johnston, 2012: p2). Researchers interchangeably use the term 'behaviour' to refer to a specific single action (e.g., swallowing a pill), or a complex sequence of actions, such as PA (Di Matteo, Haskard-Zolnierek & Martin, 2012). PA interventions are complex, requiring repeat engagement in a variety of smaller behaviours sequentially over time to yield health

enhancing benefits (Moore et al., 2015). Grounding interventions in theory facilitates greater understanding of how, why, and when change may (or may not) occur as a result of intervention (Michie & Johnston, 2012). Taylor, Conner and Lawton (2012) highlight a positive association between theory use and BCI efficacy. Though overall, evidence suggests a weak and inconsistent association between reported theory use and intervention effectiveness (Dombrowski et al., 2012; Prestwich et al., 2014; Dalgetty, Miller, & Dombrowski, 2019). Comparably inconsistent findings are mirrored among PA interventions, with Taylor and colleagues (2012) and Gourlan et al. (2016) identifying a positive association between theory use and PA intervention effectiveness, whilst Prestwich et al. (2014) and Bernard et al. (2017) did not.

Notwithstanding, there is a positive association between intervention efficacy and the extent to which theory is explicitly defined and rigorously applied (Webb et al., 2010; Taylor et al., 2012; Bluethmann et al., 2017). Michie and Prestwich (2010) lament the perception of theory as something to provide a 'loose framework' throughout BCI design and implementation. Weak or improper theory use creates uncertainty as to why some intervention components are included rather than others (Prestwich et al., 2014), and mitigates investigation regarding the suitability and/or effectiveness of particular theories (Hutchinson, Brekon, & Johnston, 2008). Specifically, it becomes implausible to assess the suitability of individual theories, such as the Transtheoretical Model of Change (TTM), to inform the development of effective PA interventions if only parts of the theory are utilised. Weak and inconclusive evidence to support theory use may reflect the limitations of performing 'blunt comparisons' between PA interventions without careful consideration and comparison in terms of the quality of theoretical application (Prestwich et al., 2014).

To date, TTM (Prochaska, 1986), Theory of Planned Behaviour (TPB) (Ajzen, 1985), and Social Cognitive Theory (SCT) (Bandura, 1986), remain the most prominent theories used to inform health related BCIs (see Davis et al., 2015). Previous evidence supports the use of these social cognition theories to facilitate increased PA: TTM (Jackson, Asimakopoulu & Scammell, 2007; Scruggs et al., 2017), TPB (Blanchard, 2008; Hagger, Chatzisarantis & Brickell, 2008; Webb et al., 2010), and SCT (Stacey et al., 2014; Young et al., 2014). Nonetheless, a shared criticism of each theory pertains to the stated locus of causality for behaviour, with behaviour conceptualised as a result of deliberate, planned forms of intended action (Sniehotta, Presseau & Araujo-Soares, 2014). Ultimately, this theoretical vantage point marginalises the salience of implicit, impulsive and automatic behavioural influences originating beyond conscious awareness (Sheeran, Gollwitzer & Bargh, 2013; Hagger & Chatzisarantis, 2014). For instance, intention represents a motivational construct reflecting the degree of effort an individual is prepared to invest to complete an action (Ajzen, 1991). Intention is a central tenet of TPB and also inextricably linked, albeit to a lesser extent, to both TTM and SCT (Hagger & Chatzisarantis, 2014). Increased intention to perform PA is perceived as a mediator for actual PA engagement, though a plethora of evidence demonstrates a weak and inconsistent association between intention and PA (Armitage, 2005; Hardeman et al., 2011; Rhodes & Dickau, 2012; Plotnikoff et al., 2014; Jekauc et al., 2015; Williams et al., 2015 and Stolte et al., 2017).

In recent decades, Self-Determination Theory (SDT) has emerged as a prominent theory among PA intervention literature (Deci & Ryan, 1985; Teixera et al., 2012). SDT is a meta-theory of human motivation where individual well-being and motivation are moderated by the extent to which three basic psychological needs of autonomy, competence and relatedness are met (Deci & Ryan, 1985; Ryan & Deci, 2000). Autonomy refers to a perception

of agency over one's own behaviour, competence reflects belief that an intended action can be performed successfully, and relatedness refers to a perceived sense of belonging among peers (Ryan & Deci, 2000). Within SDT, motivation exists on a continuum which includes intrinsic and extrinsic motivation, as well as amotivation. Intrinsic motivation involves performing an activity for its own sake, most commonly due to enjoyment, and is the most powerful form of self-determined behaviour. SDT-informed PA interventions seek to progressively internalize extrinsic motives, such as parent or peer pressure and feelings of guilt, in an attempt to increase autonomous PA behaviour (Fortier et al., 2012). Fortier and colleagues (2012) and Samdal et al. (2017) demonstrate positive support for the efficacy of SDT PA-based interventions. However, SDT-based interventions for ERSs yield modest and variable success (Edmunds et al., 2006; Morton, Biddle, & Beauchamp, 2008; Markland & Tobin, 2010; Rahmann et al., 2011; Duda et al., 2014)

Theory-based ERS

A plethora of SDT-informed interventions have sought to enhance ERS effectiveness. Of these, only Duda et al. (2014) explored the effectiveness of an SDT-based ERS to promote actual PA behaviour. Completion of the ERS yielded a significant short and long-term PA increase identified to be sufficient to provide health enhancing benefits (Duda et al., 2014). However, the control group receiving standard ERS provision achieved similar positive effects, creating uncertainty over whether the application of SDT contributed to the ERS success (Duda et al., 2014). Principally, SDT-informed ERSs explore the association between SDT tenets and ERS adherence (Morton et al., 2008; Markland & Tobin, 2010; Rahmann et al., 2011; Littlecott et al., 2014). Markland and Tobin (2010) posit autonomy to be low at the start of ERSs due to the external nature in which ERS clients are initially referred via a health care professional. As clients progress through ERSs, more autonomous attitudes towards PA are positively

associated with scheme completion (Morton et al., 2008; Markland & Tobin, 2010). However, the association between autonomy and ERS completion is equivocal (Wilson et al., 2003; Edmunds et al., 2006 and Rahman et al., 2011). Equivocal findings are likely due to an oversimplification of the anticipated low-to high trajectory of self-determination among ERS clients. Wormald & Ingle (2004) and Moore et al. (2011) highlight many ERS clients initiate their own referrals by approaching healthcare professionals, indicating a pre-existing high level of self-determined behaviour. Therefore, whilst greater self-determined behaviour pre-ERS is positively associated with completion (Morton et al., 2008), the ability for ERSs to facilitate increased self-determined PA behaviour remains unclear.

Conversely, there is strong evidence of a positive association between relatedness and ERS adherence (Edmunds et al., 2006; Rahman et al., 2011; Littlecott et al., 2014). Even in instances where clients regard ERS participation unfavourably, perceptions of relatedness promote continued adherence (Rahman et al., 2011). Hence, creating greater opportunities for social interaction between ERS clients are central among recommendations to enhance ERS effectiveness (Edmunds et al., 2007; Vinson & Parker, 2012; Moore et al., 2013). However, it is unclear whether more opportunities for social interaction equate to greater perceptions of relatedness. ERSs are widely accessed by a heterogenous client base (Wade et al., 2020), whereas relatedness is underpinned by perceptions of similarity (Moore et al., 2011). Thus, perceptions of relatedness are likely biased by the quantity of available social opportunities with similar others, highlighting need for further exploration of the factors to influence perceptions of relatedness within an ERS context.

A Social Identity Approach

As highlighted throughout the preceding sections, theoretically informed BCIs, to date, have principally focussed on individualistic factors, such as cognitions, attitudes, and

motivation (Bauman et al., 2012), and thus have sought to enact desired behavioural changes, such as an increase in PA, via educational, self-monitoring, and goal-setting intervention strategies (Tully & Hunter, 2015; Speake et al., 2016). Notwithstanding, the equivocal effectiveness of individualistically driven PA interventions (Rhodes & Dickau, 2012; Plotnikoff et al., 2014; Jekauc et al., 2015; Williams et al., 2015 and Stolte et al., 2017), and of particular relevance to ERSs, the equivocal evidence of SDT-informed ERSs, provide strong rationale for the saliency of greater exploration of social approaches to PA behaviour change (Stevens et al. 2017). Community PA environments are inescapably social in nature, therefore, rather than representing an independently volitional act, self-regulated PA behaviour is inseparably intertwined within the social contexts where PA occurs (Fitzsimmons & Finkel, 2010). Human beings are inherently predisposed to seek out and maintain positive social contact (Baumeister & Leary, 1995). Proclivity for social contact can directly influence PA adherence via commitment to implicit or explicit social contracts (Estabrooks, Harden, & Burke, 2012), and indirectly via increased enjoyment (Eys & Evans, 2017; Evans et al., 2019). The social identity approach presents a viable departure from the individualistic focus of previous PA and ERS interventions.

The social identity approach - comprised of both social identity theory (Tajfel, 1970; Tajfel & Turner, 1979) and self-categorization theory (Turner, 1982; Turner, Hogg, Oakes, Reicher & Wetherell, 1987) – argues ‘the self’ as an inherently social entity. According to the social identity approach, an individual is only able to develop and refine the notion of a self-concept via recognition of perceived similarities and differences to relevant others (Tajfel & Turner, 1979). Both social identity theory and self-categorization theory seek to explain the processes by which individuals assume group membership, and how subsequent social identities influence behaviour (Tajfel & Turner, 1979; Turner, Oakes, Haslam, & McGarty,

1994). In a complementary manner, social identity theory focusses on between-group social processes, whereas self-categorization theory explores the psychological mechanisms which underpin intra-group membership and cohesion (Beauchamp, 2019). Tajfel's (1970) work formed the basis of social identity theory, observing that individuals perceive fellow members of assumed social groups more favourably, act more favourably towards them, and seek to discriminate amongst members of opposing social groups. According to self-categorization theory, individuals categorize themselves according to salient attributes, such as age, sex, and socioeconomic deprivation, which subsequently shape their perceptions of others and, thus, the perceived attractiveness of group membership (Turner et al., 1987). Where perceived similarity with members of a given social group is high, individuals are more likely to experience a sense of belonging and social connectivity (Beauchamp, 2019). Adoption of a shared social identity occurs when an individual begins to perceive themselves as categorically interchangeable with other members of an identified group (Turner, 1982; 1985). Following group identification, the individual endeavours to understand what it means to assume this shared social identity and to align their attitudes and behaviours in accordance with recognised group norms, i.e., identifying as 'we' and 'us' rather than 'I' and 'me' (Turner et al., 1987; Haslam, 2004). Thus, the development of social identity primarily occurs as a function of two social processes: 1) *categorisation*: awareness of similarities that collectively connect members as a group, and 2) *identification*: positively valuing the importance of group membership (Levy et al., 2019).

Social identity and social support

Internalized group ideals imbue member's sense of self-concept, shaping individual attitudes and behaviours to reflect the collective interests of the group (Turner et al., 1987; Turner, 1991). Group membership provides individuals with meaning, support and agency, which in turn, are linked to holistic improvements in health and well-being (Sani et al., 2012;

Jetten et al., 2017; Bowe et al., 2020). That is, groups improve perceived resilience and security, reduce loneliness (Cruwys et al., 2014; Greenaway et al., 2016), and increase trust and the prevalence of reciprocal helping behaviour among group members (Wakefield et al., 2011). The adoption of shared social identity also provides the basis for reciprocal social influence (Turner, 1991), underpinning both the provision and receipt of social support (Haslam, Reicher, & Levine, 2012). Specifically, it is a subjective sense of social identification that predicts the receipt of effective social support (Haslam et al., 2005), rather than the frequency or volume of available support (Haslam et al., 2012). Shared social identity predicts the likelihood of social support being offered, as well as the extent to which offered support is perceived positively by intended recipients (Haslam, Reicher, & Levine, 2012; Greenaway et al., 2016). Accordingly, whilst there is longstanding acceptance of the critical role of social support for health and well-being (Haslam, Cruwys, Haslam, & Jetten, 2015), the social identity approach extends previous understanding by positioning social identification as the mechanism responsible for enhancing perceptions of social support, and for facilitating enhanced health and wellbeing (Haslam et al., 2015). As such, there are numerous inherent benefits to the integration of social identity theory principles within the domain of exercise referral. Social support is consistently cited as a primary facilitator of ERS completion (Edmunds et al., 2006; Rahman et al., 2011; Littlecott et al., 2014), with multiple researchers recommending further investigation of strategies to increase the provision of social support within ERS contexts (Edmunds et al., 2007; Vinson & Parker, 2012; Moore et al., 2013). From a social identity perspective, exploration of factors associated with the adoption and maintenance of shared social ERS identities may enhance perceptions of social support among ERS participants.

Social identity approach and physical activity

There is growing evidence of a positive association between social identification and PA (Stevens et al., 2017; Stevens, Rees, & Polman, 2018; Steven, Rees, & Polman, 2019). Within groups where PA is considered as important, identity-salient behaviour, individual members are more likely to identify, adopt, and maintain PA levels (Terry & Hogg, 1996; Stevens et al., 2018). Moreover, the stronger the identification (i.e., the greater extent to which group membership is perceived as being valuable), the greater likelihood of engagement (Stevens et al., 2017). Terry & Hogg (1996) found those who identified strongly with an exercise group reported greater intentions to exercise relative to those who identified weakly. More recently, Strachan, Shields, Glassford and Beatty (2012) and Stevens et al. (2018) found social identification among running group members to mediate actual PA participation levels. For instance, Stevens et al. (2018), found runners who identified more strongly as a 'parkrunner' reported more frequent parkrun participation. Taken collectively, there is strong evidence highlighting the viability of harnessing social identities to promote participation in PA interventions (Stevens et al., 2017). More specifically, there is a fruitful opportunity to utilise social identity principles to improve the poor rates of ERS completion.

Moreover, the social identity approach details the conceptual psychological mechanisms via which greater ERS group identification may be achieved. According to the social identity approach, 'prototypicality' relates to the extent to which a group member represents the core values and ideals of a group, as well as the degree to which they exhibit correspondingly suitable behaviour in any given context-specific situation (Turner, 1985). Prototypical group members act as role models for behaviour and group conduct and are critical for demonstrating what group membership entails for new members (Haslam, Reicher, & Platow, 2010). Individuals who demonstrate desirable prototypical behaviour are viewed more

positively by group members (Guth, Levati & Ploner, 2008; Foddy, Platow & Yamagashi, 2009), and are more likely to be effective leaders (Greenaway et al., 2016). Leaders who are perceived to engage in social identity leadership are more likely to promote social identification among group members, which in turn, positively influences group member adherence of exercise sessions (Stevens et al., 2019). Accordingly, promoting social leadership styles among ERS providers has the potential to increase rates of ERS completion, as well as increasing the likelihood that ERS completion will facilitate a post-scheme PA increase. However, to date, there remains limited understanding of what constitutes prototypical behaviour within an ERS context, nor sufficient understanding of how to promote social identity leadership among ERS providers. Consequently, this thesis sought to identify meaningful ways in which social identification occurs within an ERS context and to use this information to develop an intervention to promote ERS completion.

Chapter 3: Methodology

Introduction

This section outlines the methodological approach of this thesis. Specifically, it describes the originally proposed methodological approach and details subsequent modifications related to the Covid-19 pandemic. Moreover, the philosophical underpinnings of this thesis are presented, as well as data collection and analytic procedures, and ethical considerations.

Original methodological approach

This thesis planned to utilise a mixed-methodological approach to evaluate the effectiveness of AWL. The evaluation would take place at two time-points, prior to, and following the development and implementation of a social identity-informed intervention designed to enhance AWL's effectiveness. The quantitative component of the evaluation would assess rates of scheme uptake and completion, as well as physical, behavioural and well-being outcomes associated with scheme completion. Qualitative methodology would be employed to elicit the perspectives of relevant AWL stakeholders to inform the development and assess acceptability of the planned social identity-informed intervention.

Modifications to the methodological approach

The Covid-19 pandemic led to the abandonment of the follow-up quantitative evaluation to assess the effectiveness of the implemented social identity intervention. Fortunately, this disruption was not sufficiently pervasive to detract significantly from the fundamental aims of the thesis. The overarching aim of the thesis was to develop a social identity-informed intervention to enhance the effectiveness of AWL, and to offer guidance for how the intervention could be adapted for use in other ERS contexts. Subsequently, a qualitative exploration study of the intervention's retrospective acceptability among various

AWL stakeholders replaced the planned post-intervention quantitative evaluation. This exploration investigated evidence of promise for the intervention and sought to elicit feedback to enable further intervention refinement.

Final thesis structure

This thesis comprises the exploration and development of a social identity-informed intervention to enhance the effectiveness of AWL. Phase One contained a quantitative and qualitative needs analysis to explore the scope and achievability of implementing a social identity-informed AWL intervention. Phase One also enabled the gathering of salient contextual information relevant to AWL delivery in order to enhance the relevance and prospective acceptability of the intervention. Phase Two documented intervention development. AWL stakeholder perspectives were sought to establish the prospective and retrospective acceptability of the intervention pre-post implementation Further, stakeholder feedback explored evidence of promise and feedback to iteratively refine the intervention for AWL and to aid prospective future implementation within different ERS settings.

Philosophical underpinnings of mixed-methods research

The overarching methodological approach of this thesis is rooted within the philosophical paradigm of pragmatism. Pragmatism presents a relative dismissal of long-standing philosophical arguments related to the opposing paradigmatic perspectives of objectivism and constructivism. The fundamental differences between objectivism and constructivism are due to contrasting ontological and epistemological assumptions about the nature of reality and the possibility of truth (Morgan, 2014). Objectivism assumes the presence of a singular reality that exists independently from human perception, whereas constructivism contends the existence of multiple realities that are shaped by human perception and subjective

interpretations of human experiences. Positivism and interpretivism represent opposing theoretical perspectives borne from these differing assumptions of the nature of reality and are heavily allied with quantitative and qualitative research methodologies, respectively. Quantitative research seeks to test a priori hypotheses related to the belief that reality can be measured and observed objectively (Tariq & Woodman, 2013). Conversely, qualitative research presents a wide range of personal viewpoints to inform understanding of a topic from multiple perspectives (Tariq & Woodman, 2013). Subsequently, the fundamental ideological and epistemological differences between quantitative and qualitative methodologies have been alleged to be incompatible. As articulated by Lincoln (1990, p. 81):

> The immediate realization is that accommodation between paradigms is impossible. The rules for action, for process, for discourse, for what is considered knowledge and truth, are so vastly different that, although procedurally we may appear to be undertaking the same search, in fact, we are led to vastly diverse, disparate, distinctive, and typically antithetical ends.

Nonetheless, mixed-methods research (MMR), which comprises both quantitative and qualitative approaches, has become particularly prevalent within health-related research (Tariq & Woodman, 2013). Traditionally, the use of MMR is driven by a practical desire to utilize and combine the strengths of quantitative and qualitative methodology (Morgan, 2014). MMR is assumed to develop more complex and nuanced understanding than is possible via the use of one methodological approach rather than another (Bowling, 2014). Moreover, MMR is positioned as a means to yield deeper understanding (Bamberger, Rao, & Woolcock, 2010), by going beyond simple identification of phenomena to offer inference on factors that contribute to its presence (Collins, Onwuegbuzie, & Jiao, 2006). Subsequently, the use of MMR is endorsed by MRC guidance to inform the evaluation of complex interventions (Craig et al., 2008; Moore et al., 2015). In the context of complex interventions, MMR affords the ability to collect, analyse and present a range of data in guises that may be deemed variably desirable

according to stakeholder preferences (Farquhar, Ewing & Booth, 2011). For instance, at various stages of an evaluation stakeholders may favour data presented in quantitative (e.g., attendance figures, dropout rates), or qualitative formats (e.g., participant accounts) (Bamburger et al., 2010). Triangulation of data from quantitative and qualitative sources may also enhance the credibility of research findings (Brannen, 1992).

Notwithstanding, Morgan (2014) argues that the championing of the pragmatism paradigm as a convenient justification for the use of MMR understates its validity as a coherent philosophical perspective. Primarily, pragmatism presents an "alternative epistemological paradigm" (Hall, 2013, p.19) that centrally focusses on a recursive interaction between beliefs and actions (Dewey, 1910; Morgan, 2014). From a pragmatism viewpoint, human experiences are inescapably constrained by the nature of reality, however, human understanding of reality is indebted to subjective interpretations of experiences. Thus, in Dewey's philosophy (1925) objectivist and interpretivist paradigms represent two sides of the same coin as opposed to dichotomous, unrelated perspectives (Morgan, 2014). Instead, Dewey's (1925) philosophy of knowledge is contingent on inquiry. The concept of inquiry refers to a specific kind of experience where beliefs are examined and resolved through action (Morgan, 2014). Thus, adoption of a pragmatist perspective underpins the use of MMR from a philosophical standing. Specifically, pragmatism, and Dewey's systematic interpretation of inquiry (see Figure 3 below: Dewey, 1925; Morgan, 2014) present a theoretical framework to guide MMR. In this model, quantitative, qualitative, or mixed methods approaches to recognizing and considering the nature of a problem may be equally appropriate. However, rather than a linear step-by-step process, inquiry represents a continuous cycle that may go through many iterations prior to any form of resolution.

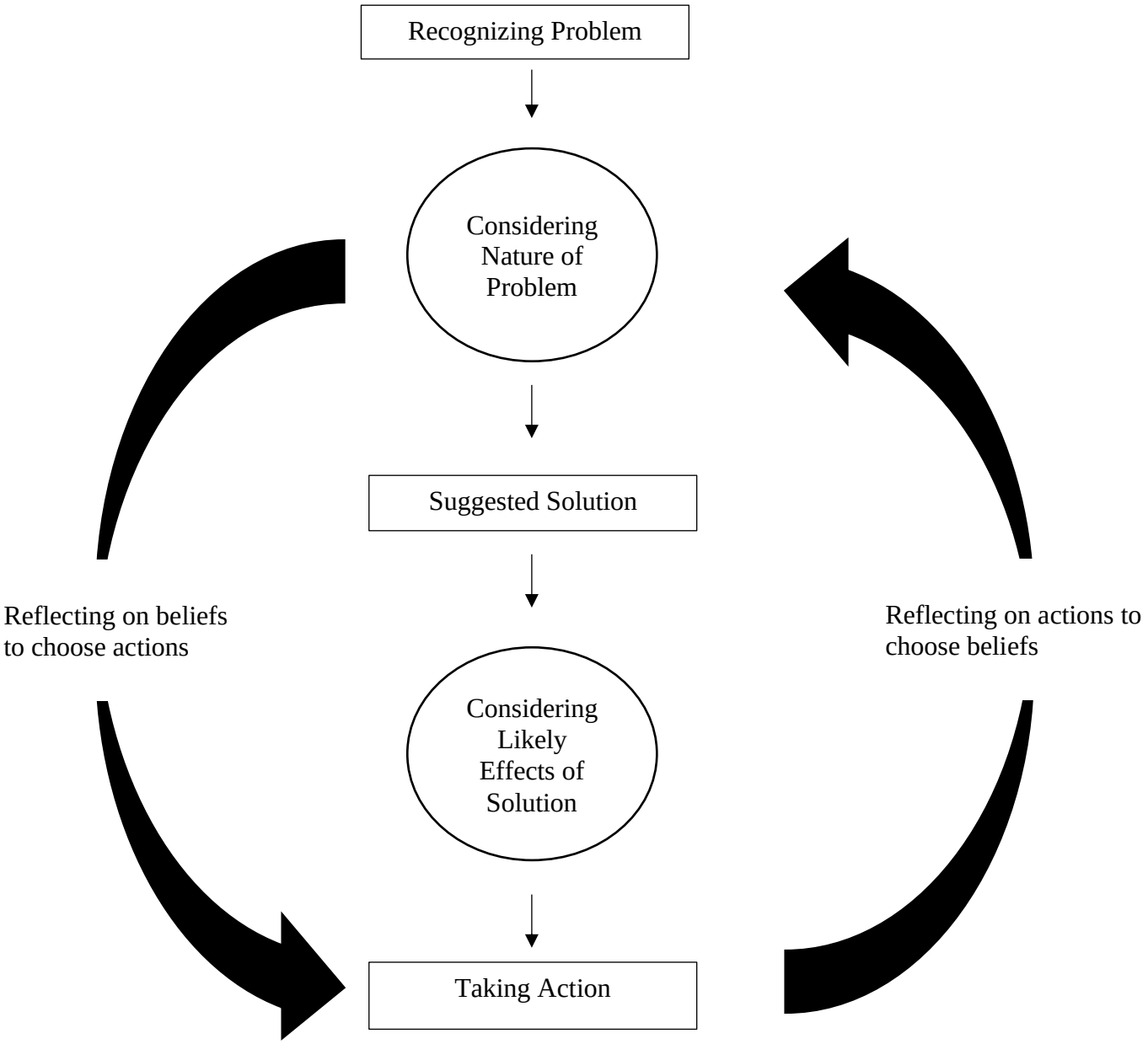

Figure 4. Dewey's model of experience adapted from Morgan (2014).

Use of mixed methods

In-depth details of how this thesis employed quantitative and qualitative methodologies are presented below.

Quantitative data

Collection

Classification of participants according to AWL uptake and completion status

Participants were classified as 'uptakers' if they had completed an AWL assessment appointment at week 1 and expressed willingness to continue on the scheme. Conversely, participants were classified as 'non-uptakers' if an initial assessment appointment could not be scheduled, or if they declined AWL participation following the assessment appointment. 'Uptakers' were granted 12-week access to one of the four available AWL leisure sites located within Banks, Burscough, Ormskirk, or Skelmersdale. Participants were classified as 'completers' if they had subsequently attended a follow-up assessment appointment at 12-weeks. 'Uptakers' who enrolled to AWL but did not attend a follow-up assessment appointment were classified as 'dropouts'.

Referral and demographic characteristics, physical, behavioural, and well-being outcome data

Participants were classified as either a primary/secondary care referral or self-referral. Primary/secondary care providers submitted participant demographic data to AWL on paper-based forms via email or fax. Self-referrals submitted demographic data directly to AWL on separate referral forms via email or post. Primary care referrals from GPs included participants' primary reasons for referral, as well as other notable health conditions. For self-referrals, it was not always possible to identify primary reason for referral amongst other reported health

conditions. All referral forms were sent to the central office at the council headquarters and date stamped upon receipt by the administrative project officer. Upon successful arrangement of an initial assessment appointment, a paper-based referral pack containing all questionnaires and a consent form were transferred to the respective centre where the participant planned to attend AWL. During the initial assessment appointment, EROs collected routine demographic information (i.e., age, sex, postcode), performed a brief physical assessment (i.e., stature (m), body mass (kg), blood pressure (mmHg)), and asked participants to complete the IPAQ-E (IPAQ, 2005) and SWEMWBS (Tennant et al., 2007; Stewart-Brown et al., 2009) questionnaires (see below for an in-depth discussion of data collection measures). EROs used a standardized script to assess primary reasons for referral and the presence of key health conditions including; cardiovascular disease (CVD), cancer, diabetes, joint pain, and mental health (see Appendix A). The assessment appointment procedure was repeated upon scheme completion at week 12. Completed referral packs were stored in-house in a locked filing cabinet at each respective leisure site location. Packs were then returned to the central council head office and stored in a locked filing cabinet. If dropout occurred before the 12-week period, these forms were returned to the council head office with reason for dropout clearly marked.

Referral packs were stored separately for completers, whilst non-uptakers and dropouts were stored together. All packs were organised by either date of completion or discharge and stored according to fiscal quarter. All referral packs were stored at the council headquarters where data were inputted directly into separate Microsoft Excel files for completers, non-uptakers, and dropouts by the lead researcher. Data inputted for completers were as follows: ID number, date of referral, source of referral, date of assessment appointment, date of completion, whether they signed up to a 6-month membership upon completion, sex, age, stature, body mass (weeks 1 & 12), BP (weeks 1 & 12), leisure site, postcode, primary reason

for referral, number of health conditions, and whether mental health was reported as part of the referral. IPAQ-E (weeks 1 & 12) and SWEMWBS (weeks 1 & 12) data were also inputted at this stage. Data inputted for dropouts were as follows: ID number, date of referral, source of referral, date of assessment appointment, date of dropout, reason for dropout, sex, age, height, weight (week 1), blood pressure (week 1), leisure site, postcode, primary reason for referral, number of health conditions, and whether mental health was reported as part of the referral. IPAQ-E and SWEMWBS week 1 data only were inputted for dropouts.

Measures

All measures were administered by EROs, trained to minimum level 3 Register of Exercise Professionals (REPs) qualification in GP referral, during individually attended assessment appointments. REPs accreditation includes relevant training on BMI and blood pressure measurement. All questionnaires were self-administered during assessment appointments.

Socioeconomic status

Postcode data were used as a proxy measure for area level socioeconomic status (SES), classified according to the English Index of Multiple Deprivation database (IMD: Department for Communities and Local Government, 2019). IMD score is inclusive of 7 criteria of deprivation: income, employment, health, education, housing, environment, and crime, with the four AWL delivery site locations varying considerably according to deprivation status. Inclusion of IMD as a relative measure of deprivation facilitated investigation of an association between rates of AWL uptake and completion and deprivation status.

Physical outcomes

Body Mass Index

Stature was assessed to the nearest 0.1cm using a stadiometer. Body mass was assessed to the nearest 0.1kg. BMI was calculated using the formula body mass/height^2 and recorded as both a continuous and categorical output. BMI classification was recorded according to WHO (2000) guidance: underweight = <18.5kg/m^2, normal weight = 18.5 – <25.0kg/m^2, overweight = 25 - <30kg/m^2, and obese = ≥30 kg/m^2.

Blood pressure

BP readings were taken using digital blood pressure monitors. Cuff size was adjusted relative to the approximate circumference of participant's upper arm. Readings were taken at the end of assessment appointments to reduce the probability of elevated BP due to recent physical exertion. Similarly, participants were advised to remain still and silent during measurement. Continuous systolic (SBP) and diastolic (DBP) BP data were recorded as separate variables (mmHg). SBP and DBP data were combined to create a categorical variable to distinguish between normal BP and hypertension (i.e., ≥140 mmHg and/or ≥90 mmHg: Williams et al., 2018).

Behavioural outcome

Physical activity

The International Physical Activity Questionnaire for the elderly (IPAQ-E: IPAQ, 2005; Hurtig-Wennlöf, Hagstromer, & Olsson, 2010, appendix C.1) was used to collect participant PA data. IPAQ-E is designed for use in those over 65 years and was chosen following a recommendation from AWL staff that an overwhelming majority of AWL clients

would comprise this age group. IPAQ-E comprises 4 questions designed to provide a quantitative estimate of PA frequency over the last 7-days. Participants responded according to the volume of walking, moderate and vigorous intensity PA performed in bouts of ≥10 mins or more, as well as the amount of time spent sedentary (mins per day). For example, IPAQ-E includes the following item – 'During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, heavier garden or construction work, chopping woods, aerobics, jogging/running, or fast bicycling?'. Scoring of IPAQ-E produced both continuous and categorical PA outputs. Continuous IPAQ-E scores were calculated by multiplication of mins x days x respective MET equivalent value. MET equivalents for walking, moderate and vigorous intensity PA were recorded as 3.3, 4.0, and 8.0, respectively (IPAQ, 2005). Thus, 30 mins moderate PA on 3 days = 30 x 3 x 4.0 = 360 moderate MET-min-week^{-1}. The sum of walking, moderate and vigorous MET-min-week^{-1}were calculated to represent total MET-min-week^{-1}. For the categorical output, participants were classified as having either 'high', 'moderate', or 'low' PA levels. High PA levels reflect the performance of either: vigorous intensity PA on ≥3 days totalling a minimum of 1500 MET-min-week^{-1}, or, a combination of walking, moderate and/or vigorous intensity PA on 7 days totalling a minimum of 3000 MET-min-week^{-1}. Moderate PA levels reflect: ≥3 days of vigorous intensity PA of at least 20 mins per day, or, ≥5 days of moderate intensity PA and/or walking of at least 30 mins per day, or, a combination of walking, moderate and/or vigorous intensity PA on ≥5 days totalling a minimum of at least 600 MET-min-week^{-1}. Low PA was used to categorise participants that did not meet the requirements for moderate or high PA classification (IPAQ, 2005).

Well-being outcome

Well-being

Indicators of psychological well-being were assessed using the short Warwick-Edinburgh Mental Well-being Scale (WEMWBS: appendix C.2) (Tennant et al., 2007; Stewart-Brown et al., 2009). SWEMWBS comprises a 7-item self-report questionnaire relating to an individual's psychological well-being (i.e., thoughts and feelings). The scale measures individual mental and emotional well-being (i.e., how 'good' they may be feeling) as well as psychological functioning (i.e., how well they perceive themselves to be functioning). Participants are provided with a series of positively worded statements, e.g., 'I've been feeling optimistic about the future' and are asked to respond using a 5-point likert scale. Participants tick the appropriate response to describe their experiences over the past 2 weeks. The range of possible answers include; 'none of the time', 'rarely', 'some of the time', 'often' or 'all of the time'. SWEMWBS scores were obtained by summing responses for each of the 7 items, with total scores ranging from 7 – 35. Comparison of pre-post SWEMWBS scores facilitated investigation of change in psychological well-being associated with AWL completion.

Data cleaning and coding

Preliminary analyses were performed in Microsoft Excel. Preliminary analyses included calculating BMI at weeks 1 and 12 using recorded stature and body mass and transformation of continuous BMI data in line with WHO (2000) classification criteria. BP data were transformed to create separate continuous variables for SBP and DBP. Age was inputted as a continuous and categorical variable for comparison with previous ERS literature, i.e., 18-24 years, 25-34 years, 35-44 years, 45-54 years, 55-64 years, 65-74 years, 75+ years (Hanson et al., 2013). IMD decile rank was generated by entering postcodes into the English indices of Deprivation website (www. http://imd-by-postcode.opendatacommunities.org/imd/2019). IPAQ-E scores were coded into days and minutes per day for each intensity of PA before entry into an Excel template to calculate MET-

min-week^{-1}of activity (Cheng, 2016). MET-min-week^{-1} was available for all PA intensities, as well as overall participant classification as performing low, moderate or high levels of PA.

Data analysis

All data were transferred into the data analysis software SPSS (IBM SPSS Statistics for Macintosh, version 25.0. Armonk, NY: IBM Corp). Shapiro Wilk tests, as well as inspections of histograms and q-q plots, were used to assess the distribution of continuous variables. Descriptive statistics and methods of analysis were selected appropriate to the distribution of the data. Mean (M) and standard deviation (SD) are presented for normally distributed variables and median (Md) and interquartile range (IQR) are presented for all non-normally distributed variables. A range of parametric and nonparametric tests were utilized in accordance with the specific aims of studies 1 and 2. An in-depth discussion of selected methods of analysis are presented within these respective chapters.

Qualitative data

Collection

Qualitative data were collected in all instances via semi-structured interview. The lead researcher conducted all interviews. Interviews were primarily conducted on a one-to-one basis, though some AWL clients were interviewed jointly. Details of joint interviews are explicitly stated within the methods section of relevant studies. A combination of purposive and opportunistic sampling strategies were used to recruit AWL clients. That is, individual chapters sought to interview AWL clients who met key criteria (e.g., AWL completers in chapter 6), though prospective participants within the respective target group(s) were recruited opportunistically. All AWL client interviews were arranged in consultation with EROs, who acted as gatekeepers. Gatekeepers facilitate access to specific populations (Crowhurst, 2013),

and promote acceptability to the interview process on the basis of a trusting relationship between gatekeeper and participant (Turner & Almack, 2016). EROs were involved in the recruitment process in the following ways: (1) EROs were given a week's notice ahead of the interview dates to ask AWL clients if they were willing to be interviewed, and (2) as interview dates coincided with supervised session times, EROs were asked to invite any AWL clients to interview that were in the gym whilst interviews were being conducted. Interviews with AWL staff were arranged directly with the lead researcher for convenience. One AWL client expressed a preference for an ERO to be present during their interview. All other AWL client interviews were conducted privately in the absence of EROs to maintain participant confidentiality (Mack et al., 2005). With the exception of one interview with an AWL staff member, all interviews were conducted within private rooms of AWL leisure site facilities. The noted staff member interview was conducted in a private room at Edge Hill University. All participants were provided with study information sheets detailing the wider aims of the evaluation partnership between AWL and Edge Hill University, as well as specific information pertinent to the relative aims of each respective study. Written and verbal consent were obtained prior to all interviews. Participants were debriefed following interview completion and were given the opportunity to ask any further questions regarding their involvement. Data from individual participant interviews were not discussed among other participants at any point. Specifically, AWL client interview data were not shared with EROs nor ERO interview data shared among other EROs. All interviews were digitally recorded and transcribed verbatim with the permission of each participant. During transcription, all identifying information pertaining to participants, other AWL clients or staff and/or leisure site location were replaced by pseudonyms to ensure anonymity. Subsequent audio files and transcripts were securely stored within password-protected folders of a personal external hard drive. The external hard drive and hard copy informed consent forms were stored in a locked cabinet in

the lead researcher's office. Interview guides were prepared and utilized appropriate to the respective aims of individual studies (see Appendix B). Wording and inclusion of individual interview questions were tailored according to participant status as an AWL client, AWL staff member or AWL peer. Hence, interview guides for AWL staff members only included questions focussed on the acceptability of proposed operational changes to the AWL scheme.

Ensuring quality

Validity, reliability, generalizability and objectivity are established hallmarks of quality quantitative research (Winter, 2000). By contrast, qualitative research is much less of a single, unified practice (Reissman, 1994), and thus, traditionally, there has been greater scope and contested interpretations of what constitutes high quality qualitative research. Fundamentally, qualitative research conveys the 'story' of a research project, articulating the views of participants (Greene, 1994). However, in practice, this may be achieved using a variety of differing methodologies, which themselves, may be intrinsically indebted to different ontological and epistemological perspectives. The qualitative components of this PhD were conducted in accordance with Tracy's (2010) eight criteria of (1) worthy topic, (2) rich rigour, (3) sincerity, (4) credibility, (5) resonance, (6) significant contribution, (7) ethical, (8) meaningful coherence. These criteria are presented as universal hallmarks of high-quality qualitative research that remain untethered to any specific philosophical paradigm (Tracy, 2010). Lincoln and Guba (1985) advocate qualitative research reports that appear dependable and credible. In line with Tracy (2010), this thesis employed three primary means of establishing credibility via demonstration of meaningful coherence, provision of thick descriptions, and member reflections. Meaningful coherence reflects the need for a researcher to demonstrate eloquence in their choice and application of research methods in line with the underlying theoretical framework. Thus, adoption of a use-inspired approach, involving the

presentation of results in straightforward language and clearly presented practical implications, coherently aligned with the aim of co-developing and implementing a social identity-informed intervention to improve AWL effectiveness (Tracy & Rivera, 2010). Similarly, thick descriptions were presented to enhance the perceived acceptability of the intervention among AWL clients and providers. Thick descriptions entail offering sufficient detail during the presentation of participant narratives so that readers are able to draw their own conclusions from provided data. In this regard, there is an emphasis on showing the data, as opposed to telling the reader what to think (Tracy, 2010). Here, thick descriptions enabled demonstration to AWL providers that the intervention was directly informed by the views and perspectives of AWL stakeholders. Lastly, member reflections aid the researcher by eliciting valuable stakeholder feedback to affirm, or challenge, interpretations of analysed data (2010). At various stages, member reflections were sought from AWL staff to confirm the lead researcher had an appropriate contextual grasp of the nature and nuance of the AWL scheme. Theis thesis also sought to establish sincerity by providing a transparent account of all data collection and analysis processes. Throughout all stages of data analysis, a supervisory team member with extensive experience of qualitative research acted as a 'critical friend'. Specifically, they were responsible for challenging the analytical process and construction of knowledge (Smith & McGannon, 2018). Use of a critical friend is indicative of good practice within qualitative research and fosters transparency throughout the data analysis process (Tracy, 2010). Moreover, acknowledgement of the use of EROs as gatekeepers provides a transparent account of how data collection occurred, which may aid future research conducted in comparable contexts. However, due to the vested interests of EROs as AWL staff and their likely preference for AWL to be evaluated positively, it is possible, indeed even likely, for EROs to have put forward AWL clients who they considered more likely to provide positive evaluations. Thus, there is potential for selection bias to have influenced the data, though measures to combat

such bias were taken throughout. For example, by only giving EROs fundamental, but suitably vague, information regarding what client interviews would entail. Or, framing interview questions in a manner that focussed primarily on the client's own experiences, such as facilitators and barriers to their engagement, rather than positive or negative aspects of AWL as a scheme.

Analysis

All qualitative data were analysed using thematic analysis (TA). TA presents a theoretically flexible method of analysing qualitative data that remains unattached to a specific philosophical paradigm (Braun & Clarke, 2006; 2013). Consistent with the aims of this thesis, TA also provides a robust means to analyse and present qualitative data in a manner that is easily accessible to both academic and non-academic audience members (Braun & Clarke, 2014). Specifically, the use of TA was anticipated to facilitate greater comprehension and acceptability of research data among AWL staff and stakeholders, thus, enhancing the prospective acceptability of proposed changes to AWL. As Braun & Clarke's (2006; 2013) version of TA can be flexibly applied to address a range of research aims, researchers are required to make some 'active choices' in their application of TA (Braun, Clarke, & Weate, 2016). One choice relates to whether data analysis is performed at a semantic (i.e., the explicit or surface meaning of the data), or latent level (i.e., attempting to capture underlying meaning or assumptions). Further, researchers may adopt inductive (i.e., 'data-driven'), or deductive approaches to analysis (i.e., where an analysis is guided by a pre-designated model or theoretical construct) (Braun et al., 2016). Consistent with the overarching use-inspired approach adopted by this thesis, data-analysis was primarily conducted at a semantic, inductive level. Explicit feedback from a variety of AWL stakeholders was collated and analysed to inform the development of a contextually specific intervention. Engagement with this practice

enhanced the likelihood that the subsequent intervention would be deemed acceptable and feasible by AWL clients and providers. However, the choices between semantic/latent and inductive/deductive coding are not dichotomous, and as common within TA practice (Braun et al., 2016), this thesis comprised both. For example, in chapter 8, the ineffable experience and feelings of belonginess consistent with the adoption of shared social identity is unlikely to have been explicitly addressed within participant responses, thus requiring a more interpretative, latent approach to data analysis.

The use of TA does not impose strict regulations in relation to sample size and/or strategy, though Braun & Clarke (2006) recommend a minimum of six interviews to enable a sufficiently robust analysis. Subsequently, sample size throughout this thesis varied according to the individual aims and nature of specific research questions. For example, exploration of the AWL context and perceived facilitators and barriers to AWL completion were the primary aims of the first qualitative study. Thus, it was appropriate to recruit a greater number of participants in order to identify sufficient breadth of facilitators and barriers and to facilitate deep contextual understanding. In contrast, the second qualitative study had a narrower focus on identifying desirable AWL peer characteristics. Subsequently, the second study recruited fewer participants, though interviews were generally longer and more in-depth. The criteria outlined by Tracy (2010) are intended to be broadly applicable to all forms of qualitative research and therefore, subsume hallmarks of quality within the application of TA. However, specific features of quality TA as outlined by Braun et al. (2016) include ensuring that equal attention is paid to each data point during the coding process, and that themes are generated following a thorough, inclusive, and comprehensive coding process rather than relying on few vivid examples. Following Braun and Clarke's (2013) guidance, TA within this thesis adhered to the following 6-step process: first, data immersion was achieved via conducting of

interviews, listening to audio files, transcription of audio recordings and reading and re-reading of transcripts. Engagement in these processes facilitated an intimate familiarity with data, contributing to subsequent sense making and knowledge construction. Next, chunks of the data set were assigned codes in relation to specific study aims. At this stage, chunks of the data set that contained interesting and/or unanticipated perspectives were also coded. The third and fourth steps involved the identification of codes that reflected similar issues, before pooling these codes together to construct potential themes. These initial themes were scrutinized for suitability and consistency to ensure each code was appropriately reflected by its overarching theme. Once the final thematic structure was established, illustrative quotes were extracted from the data set as supporting evidence.

Ethical approval

Ethic approval was granted on 15/1/2018 from the Faculty of Arts and Sciences Research Ethics Committee at Edge Hill University (SPA-REC-2017-008). Chair's action was taken on 26/7/2019 to approve a minor amendment to the original ethics submission. This amendment was to reflect the development of the peer intervention and subsequent peer training protocols.

Thesis study map

A thesis study map is presented at the beginning and end of each chapter of original research to outline corresponding objectives and key findings.

Study	Objectives and Key Findings
Study One – Uptake and completion rates of AWL	**Objectives** - Explore rates of AWL uptake and completion - Explore demographic and referral characteristics of those who accessed AWL
Study Two – Physical, behavioural and well-being outcomes associated with AWL completion	
Study Three – Facilitators and barriers to AWL completion: A needs analysis	
Study Four – Optimizing peer support in AWL: AWL client and stakeholder perspectives on peer recruitment and implementation	
Study Five - Acceptability of the AWL peer intervention: Evidence of promise and lessons for the future	

Chapter 4: Uptake and completion rates of AWL

Introduction

Despite the widespread proliferation of exercise referral schemes (ERSs) throughout the UK and beyond, there is a lack of evidence to support their effectiveness for improving health and well-being (Pavey et al., 2011; Campbell et al., 2015). Poor rates of ERS uptake and completion are significant barriers to effectiveness and cost-effectiveness (Pavey et al., 2011). Pavey and colleagues' (2011) highlight a need to attain better understanding of the socio-demographic characteristics of those who access ERSs, as well as those most likely to complete ERSs. Greater understanding of ERS uptake and completion within discrete sub-populations can facilitate better targeting and recruitment among future ERSs (James et al., 2008). This chapter presents findings from a short-term process evaluation of AWL's ERS.

Pavey et al. (2012) report a wide range of ERS uptake (28% – 100%) and completion (12%-93%) rates. ERS RCT's had higher uptake than observational studies of ERS (80% *vs.* 66%), whilst completion rates were similar (43% *vs.* 49%) (Pavey et al., 2012). Recent evidence from pragmatic ERS evaluations estimate uptake rates to conservatively reside between approximately 75 – 85% (Hanson et al., 2013; Campbell et al., 2015). Completion rates reported by Mills et al. (2012), Murphy et al. (2012), Hanson et al. (2013), Kelly et al. (2017), and McGeechan et al. (2018) ranged between 42% - 57%. Thus, approximately half of all who enter ERSs fail to complete, ostensibly confirming that ERSs are not an appropriate intervention for all. Moreover, failure to meaningfully improve ERS completion rates over time indicates that subsequent recruitment strategies have not been suitably modified to target those most likely to complete ERSs. Therefore, the need to identify factors associated with ERS uptake and completion remains (Pavey et al., 2012; Kelly et al., 2017).

Increasing age is a consistent predictor of ERS uptake (Hanson et al., 2013; Campbell et al., 2015) and completion (Pavey et al., 2012; Campbell et al., 2015; Kelly et al., 2017). However, associations between ERS uptake and completion and other demographic characteristics, such as sex and socioeconomic deprivation, are less clear. Women have been identified as being more likely to uptake ERS (Tobi et al., 2012; Duda et al., 2014) but less likely to complete (Pavey et al., 2012; Moore et al., 2013; Kelly et al., 2017). In contrast, others have reported no association between sex and the likelihood of ERS completion (Hanson et al., 2013; Sowden et al., 2008; James et al., 2008). Greater socioeconomic deprivation is linked to lower uptake for some ERSs (Sowden et al., 2008; Murphy et al., 2012; Hanson et al., 2013), but not others (Parretti et al., 2017). Parretti et al's. (2017) ERS recruited 59.6% of participants from areas of high socioeconomic deprivation, highlighting the saliency of the socioenvironmental context in which an ERS is delivered. Referral mode is a similarly inconsistent predictor of ERS uptake and completion (Gidlow et al., 2007; Kelly et al., 2017). Gidlow et al. (2007) identified referral via a general practitioner to promote greater uptake, whilst Hanson et al. (2013) found referral via cardiac rehab led to better rates of completion. Further, Kelly et al. (2017) identified a positive association between completion and referral from a secondary, rather than primary, care organisation.

Overweight and obesity are the most prevalent primary reasons for referral to ERSs (Tobi et al., 2012; Duda et al., 2014; McGeechan et al., 2018; Taylor et al., 2019). Hanson et al. (2013) and Parretti et al. (2017) reported 87.9%, and 84% of participants were classified as overweight or obese, respectively. Musculoskeletal health conditions and cardiovascular disease (CVD) are similarly common reasons for referral (James et al., 2008; Hanson et al., 2013; McGeechan et al., 2018). Referral due to CVD is associated with ERS completion (Campbell et al., 2015), as well as better completion compared to referral due to

musculoskeletal or mental health conditions (James et al., 2008; Sowden et al., 2008), or respiratory/pulmonary conditions (Sowden et al., 2008; Mills et al., 2012). Referral due to a mental health condition is negatively associated with ERS uptake (Gidlow et al., 2007; Murphy et al., 2012) and completion (Crone et al., 2008), compared to referral for a physical health condition (Kelly et al. 2017). However, discrepancy in how primary reasons for referral are categorised and reported between studies may limit further identification of associations with uptake and completion (Campbell et al., 2015). Moore et al. (2013) also identified a positive association between pre-ERS physical activity (PA) levels and rates of uptake and completion.

The increasing prevalence of naturalistic observations and pragmatic ERS evaluations enables greater understanding of ERS engagement under 'real-life' conditions (Dugdill et al., 2005; McGeechan et al., 2018). Accordingly, awareness of demographic and referral characteristics linked to ERS uptake and completion is continuing to expand. However, given the modest and inconsistent evidence to date, there remains need for further investigation. This study sought to explore the uptake and completion rates of Active West Lancs' ERS (AWL). Alongside the traditional ERS referral routes of primary and/or secondary care organizations, AWL was novel due to its widespread inclusion of participants accessing the scheme via self-referral. Self-referrals have previously only accounted for a marginal percentage of participants among ERS evaluations (e.g., 3% in Taylor et al., 2019). Thus, the AWL evaluation facilitated a previously unexplored comparison of uptake and completion rates of self-referrals relative to those who accessed the scheme via 'traditional' referral routes. Further, the existing vague and inconsistent association between socioeconomic deprivation and ERS uptake and completion may be a consequence of discrepant recruitment and/or delivery mechanisms hindering accurate comparisons between ERSs occurring within differing socioenvironmental contexts. In contrast, the uniform delivery of AWL across four leisure sites of significantly variable

socioeconomic deprivation enabled comparison of between-site uptake and completion rates. Consequently, this study had two primary aims: (1) to explore rates of AWL uptake and completion, and (2) to explore demographic and referral characteristics of those who accessed and completed AWL.

Methods

Study design

This study comprised a short-term evaluation of AWL's ERS. AWL gave permission to access ERS uptake, dropout and completion rates at weeks -0, -1 and -12.

Data collection

Data were available for all participants referred to AWL between May 2018 and January 1st, 2020. The main delivery points of AWL are provided elsewhere (see chapter 1).

Data analyses

All data were transferred into the data analysis software SPSS (IBM SPSS Statistics for Macintosh, version 25.0. Armonk, NY: IBM Corp). Numbers and percentages of non-uptakers, uptakers, completers and dropouts were analysed, as well as distributions of age, sex, indices of multiple deprivation (IMD) decile, source of referral, and primary reason for referral. Separate analyses were performed to assess associations and differences between non-uptakers *vs.* uptakers, and completers *vs.* dropouts.

'Non-uptakers' vs. 'uptakers'

All associations at this stage were tested for categorical variables only (sex, age group, IMD decile, source of referral, reason for referral, and season of referral). A series of Chi-square tests for independence (χ^2) were performed to test for associations between referral characteristics and non-uptake *vs.* uptake.

'Completers' vs. 'dropouts'

A series of Chi-square tests for independence (χ^2) were performed to test for associations between referral characteristics for completers and dropouts. Shapiro-Wilk tests, as well as inspections of histograms and q-q plots, were used to assess normality for all continuous variables. The continuous variables included at this stage of analysis were; BMI (week 1) blood pressure (diastolic and systolic, week 1), total, vigorous, moderate and walking MET-min-week^{-1}, sitting time (mins/day), and SWEMWBS (total). Means (M) and standard deviations (SD) are presented for systolic (SBP) and diastolic (DBP) blood pressure, which were the only normally distributed variables. Differences in blood pressure were explored using independent t-tests, with eta squared statistics provided to illustrate effect size. Median (*Md)* and interquartile range (*IQR)* are presented for all non-normally distributed variables. Mann-Whitney U tests were used to explore differences between completers and dropouts for all non-normally distributed continuous variables.

A subsequent binary logistic regression investigated whether any referral characteristics could predict scheme completion. The decision was made to exclude BMI (week 1) and SWEMWBS (week 1) variables due to the volume of missing data (i.e., >40%) (Jakobsen et al., 2017). Little's MCAR test was conducted for all other continuous variables, revealing data to be missing completely at random (p >.05). Following the recommendations by Jakobsen et al. (2017), it was decided to include observed data only within the regression analysis, rather than performing multiple imputation. Accordingly, 92 cases were omitted for missing IPAQ METs data, including total, vigorous, moderate and walking METs, as well as sitting time. A further 58 cases were omitted for missing blood pressure (systolic & diastolic) and 25 cases removed for missing IMD decile data. All continuous variables were screened for potential outliers. Cases varied considerably for all IPAQ METs data, however, it was

considered inappropriate to remove or transform any cases due to the inherent likelihood of variability in the self-reported PA of a heterogenous sample of individuals of differing ages and health conditions. Cox and Snell, and Nagelkerke scores were used to describe the variance of the model, with Hosmer and Lemeshow used to assess goodness-of-fit of the model for predicting scheme completion.

Effect size and post-hoc tests

Where appropriate, phi coefficients (2 x 2 categories) or Cramer's V (φ_c) (2 x 3+ categories) were used to determine effect size for all significant chi-square analyses. The effect size scale ranged from 0 to 1 in either a positive or negative direction, with magnitude recognized as 0.1 = small effect, .30 = medium effect, and .50 = large effect (Cohen, 1988; Gravetter & Wallnau, 2012). Additionally, adjusted residuals (*Z* scores) are presented for all Chi square analyses of 2 x 3+ categories. Adjusted residuals allow inspection of differences between groups while accounting for sample size variation among individual categories. Adjusted residuals represent the number of standard deviations above or below the mean, with positive scores indicating the presence of more cases than expected and negative scores indicating less (Agresti, 2002). *Z* scores above 2.0 indicate a significantly larger number of cases than expected. Scores below -2.0 indicate significantly less. *Z* scores above 2.0 or below -2.0 indicate even greater magnitude of distance from the mean. For Mann-Whitney U tests, effect size was calculated using $r = z/(\sqrt{N})$. Subsequent effect sizes for t-test and Mann-Whitney U analyses were presented in line with Cohen's (1988) guidance, with effect size magnitude recognised as 0.01 for a small effect, .06 = moderate effect, and .14 a large effect for t-tests, and 0.1 indicting a small effect, 0.3 indicating a medium effect, and 0.5 a large effect, for Mann-Whitney U tests.

Results

Number of referrals

Between May 2018 and January 2020, 973 referrals were made to the scheme. Out of 973 referrals, 760 (78.1%) accepted their referral, whilst 213 (21.9%) did not uptake. Of the 760 who entered the scheme, 113 (14.9%) were still participating and their data have been omitted from all following analyses, 273 (35.9%) had completed, and 374 (49.2%) had dropped out. Recognising adherence solely in terms of completion or dropout, the equivalent completion rate was 42.2% (57.8% dropped out).

Demographics of referrals (Excluding those categorised as still participating)

Referrals had a mean age of 53.82 years (SD = 17.01) and were predominantly female (62%, n = 533). Key descriptive characteristics for all participants are presented below in Table 1. Four hundred and sixty-nine (55.2%) referrals were self-referrals, with 381 (44.8%) referrals made by a primary or secondary care organisation. The most common primary reasons for referral were due to CVD or significant risk factors (i.e., high cholesterol or blood pressure) (24.1%, n=176), mental health (anxiety or depression) (23.7%, n = 173), and musculoskeletal related conditions (16.1%, n = 118). Most participants were referred to Skelmersdale leisure centre (*n* = 307, 46.2%), with Banks (*n* = 58, 8.7%) receiving the lowest number of referrals. Burscough and Ormskirk received 102 (15.4%) and 197 (29.7%) of the total referrals, respectively.

Table 1. Descriptive characteristics of referrals.

	All referrals		Non-uptake		Completers		Dropouts	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sex (n = 860)								
Male	327	38	71	33.3	121	44.3	135	36.1
Female	533	62	142	66.7	152	55.7	239	63.9
Age (n = 844)								
18-24	49	5.8	19	9.6	11	4.0	19	5.1
25-34	91	10.8	35	17.8	10	3.7	46	12.3
35-44	116	13.7	37	18.8	24	8.8	55	14.7
45-54	133	15.8	29	14.7	34	12.5	70	18.7
55-64	174	20.6	35	17.8	62	22.7	77	20.6
65-74	201	23.8	31	15.7	94	34.4	76	20.3
75+	80	9.5	11	5.6	38	13.9	31	8.3
Decile of Deprivation (n = 823)								
1 (Most)	144	17.5	48	23.3	24	9.2	72	20.3
2	127	15.4	38	18.4	29	11.1	60	16.9
3	62	7.5	17	8.3	17	6.5	28	7.9
4	73	8.9	11	5.3	23	8.8	39	11
5	45	5.5	10	4.9	15	5.7	20	5.6
6	79	9.6	15	7.3	30	11.5	34	9.6
7	66	8.0	22	10.7	21	8.0	23	6.5
8	132	16.0	33	16	44	16.8	55	15.5
9	61	7.4	9	4.4	33	12.6	19	5.4
10 (Least)	34	4.1	3	1.5	26	9.9	5	1.4
Source of referral (n = 850)								
Health Provider	381	44.8	99	46.5	113	41.9	169	46.0
Self	469	55.2	114	54.5	157	58.1	198	54
Reason for referral (n =731)								
Cancer	29	4.0	1	1.0	16	5.9	12	3.3
Cardiac	176	24.1	16	16.5	78	28.8	82	22.6
Diabetes	52	7.1	6	6.2	20	7.4	26	7.2
Mental Health	173	23.7	33	34.0	41	15.1	99	27.3
Mental Health (Other)	10	1.4	3	3.1	1	0.4	6	1.7
Musculoskeletal	118	16.1	5	5.2	54	19.9	59	16.3
Obesity	82	11.2	21	21.6	23	8.5	38	10.5
Respiratory	69	9.4	12	12.4	25	9.2	32	8.8
Stroke	11	1.5	0	0	7	2.6	4	1.1
Other	11	1.5	0	0	6	2.2	5	1.4
Number of reported health conditions (n = 732)								
1	239	32.7	65	66.3	70	25.8	104	28.7
2	220	30.1	13	13.3	91	33.6	116	32.0
3	273	37.3	20	20.4	110	40.6	143	39.4

Reasons for non-uptake

There were four primary reasons why individuals did not uptake referral: (1) organisers were unable to contact an individual to arrange a week 1 assessment appointment (n = 95, 44.6%), (2) non-attendance of week 1 assessment appointment (n = 90, 42.3%), (3) individual's declining the scheme (n = 20, 9.4%), and (4) ineligibility of referral, e.g., too young to access scheme (n = 8, 3.8%).

'Uptake' vs. 'non-uptake'

A series of chi-square tests for independence were performed to investigate associations between uptake and non-uptake. There were significant associations between uptake and age category, $\chi^2(6, n = 844) = 35.2$, $p \leq .001$, $\varphi_c = .20$, and between uptake and IMD decile, $\chi^2(9, n = 823) = 23.3$, $p = .006$, $\varphi_c = .17$. Uptake was highest amongst those aged between 65-74 years (84.6%, Z = 3.0) and 75+ years (86.3%, Z = 2.1) and lowest for those aged between 25-34 (61.5%, Z = -3.6) and 18-24 (61.2%, Z = -2.6). There was no obvious pattern for uptake in relation to IMD decile, with uptake lowest amongst those from deciles 1 (66.7%, Z = -2.5), 7 (66.7%, Z = -1.6), and 2 (70.1%, Z = -1.4), and highest amongst those from deciles 10 (91.2%, Z = 2.2), 9 (85.2%, Z = 1.9), and 4 (84.9%, Z = 2.1). Analyses also revealed significant associations between uptake and season of referral, $\chi^2(3, n = 814) = 11.57$, $p = .009$, $\varphi_c = .12$), and reason for referral, $\chi^2(6, n = 699) = 30.17$, $p < .001$, $\varphi_c = .21$). Uptake was higher for those referred during Spring (82.2%, Z = 3.2), compared to Winter (74.0%, Z = .0), Summer (70.4%, Z = -1.8), or Autumn (68.4%, Z = -1.5). Following the removal of categories with low numbers (i.e., 'mental health (other)' n = 9, 'stroke' (n = 7), and 'other' (n = 6), uptake rates were found to be highest amongst those referred due to a musculoskeletal condition (95.8%, Z = 3.2) or CVD (90.9%, Z = 2.0). Uptake was lowest amongst those referred due to obesity (74.4%, Z = -3.4) or mental health (80.9%, Z = -2.5). Analyses revealed no significant associations between

uptake and sex, χ^2 (1, n = 860) = 2.64, *p* =.10, or uptake and source of referral, χ^2 (1, n = 850) = .23, *p* =.63.

'Completers' vs. 'non-completers'

There were 374 referrals that did uptake the scheme but failed to complete. Of these, the primary reason for dropout was non-attendance (*n* = 182, 49.6%). Referrals were marked as non-attenders if they were identified by exercise referral officers (EROs) as no longer accessing the scheme and EROs were unable to establish contact to ascertain the specific reason(s). Where it was possible to establish contact, the most common reasons for dropout were for medical reasons (*n* = 76, 20.7%), failure to attend a 12-week assessment appointment (*n* = 34, 9.3%), and voluntary withdrawal from the scheme (*n* = 22, 6.0%). In order of prevalence, subsequent reasons for dropouts were; inability to contact referral (*n* = 19, 5.2%), mental health (*n* = 10, 2.7%), family (*n* = 9, 2.5%), referral left the area (*n* = 9, 2.5%), non-attendance of gym induction (*n* = 5, 1.4%), and 1 other, undisclosed reason (0.3%).

Analysis

A series of chi-square tests for independence were performed to investigate associations between completers and non-completers according to demographic characteristics, referral characteristics, and baseline measures.

Demographic characteristics

There were significant associations for sex: χ^2 (1, n = 647) = 4.1, *p* =.042, *phi* = -.08, and age: χ^2 (6, n = 647) = 39.3, *p* <.001, φ_c = .25. Non-completion rates were highest among females (61.1%, *Z* = 2.1), and those aged between 25-34 years (82.1%, *Z* = 3.9) and 35-44

years (69.6%, $Z = 2.3$). In contrast, males (52.7%, $Z = -2.1$), and those aged 75+ years (44.9%, $Z = -2.3$) and between 65-74 years (44.7%, $Z = -4.0$) were more likely to complete the scheme. There was no evidence for a direct linear association between age and non-completion, with the youngest referrals (18-24 years) reporting 63.3% dropout ($Z = 0.6$). There were significant associations for IMD decile: χ^2 (9, n = 617) = 49.0, p <001, φ_c = .28, and leisure site, χ^2(3, n = 638) = 49.0, p <.01, φ_c = .28. Those within the most deprived deciles were less likely to complete (D1 = 75.0%, $Z = 3.8$), compared to those within the least deprived deciles (D9 = 36.5%, $Z = -3.2$; D10 = 16.1%, $Z = -4.8$). Moreover, those referred to Skelmersdale were least likely to complete (65.9%, $Z = 4.1$), and those referred to Burscough most likely (26.3%, $Z = -6.8$), mirroring the IMD results. Further exploration revealed a significant association between IMD decile and leisure centre, χ^2(27, n = 635) = 398.9, $p \leq .001$, φ_c = .46.

Table 2. IMD decile by leisure site

	Banks		**Burscough**		**Ormskirk**		**Skelmersdale**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Decile of Deprivation (n =635)								
1 (Most)	0	0	1	1.0	5	2.6	88	30.0
2	0	0	1	1.0	7	3.7	82	28.0
3	0	0	1	1.0	4	2.1	41	14.0
4	4	7.4	2	2.1	21	11.0	36	12.3
5	3	5.6	5	5.2	21	11.0	7	2.4
6	16	29.6	18	18.6	25	13.1	6	2.0
7	9	16.7	21	21.6	12	6.3	10	3.4
8	12	22.2	23	23.7	56	29.3	13	4.4
9	9	16.7	17	17.5	21	11.0	7	2.4
10 (Least)	1	1.9	8	8.2	19	9.9	3	1.0

It was not possible to investigate associations between IMD and completion status whilst stratifying according to leisure centre due to missing data (e.g., low cell counts in least deprived deciles for Skelmersdale). Accordingly, IMD status was re-categorised as a dichotomous variable with D1 through D5 recategorized as ‘most deprived’ and D6 through D10 as ‘least deprived’. There was a significant association (with Yates’ Continuity

Correction) between IMD status and completion, χ^2 (1, n = 635) = 24.5, p <.001, *phi* = .20. Those from the most deprived deciles were less likely to complete (67%, Z = 5.0) compared to those from the least deprived (46.9%, -5.0). There were no significant associations between completion and season or source of referral.

Referral characteristics

There were significant associations for reason for referral, χ^2(6, n = 605) = 17.0, p = 0.09, φ_c =.17), mental health as a referral condition, χ^2(1, n = 627) = 25.4, $p \leq$.001, *phi* = .21, and BMI classification (week 1), χ^2(2, n = 451) = 16.80, $p \leq$.001, φ_c = .19. Non-completers were more likely to be referred due to a mental health condition (70.7%, Z = 3.6) and least likely to have been referred due to cancer (42.9%, Z = -1.6), CVD (51.2%, Z = -1.9), or musculoskeletal (52.2%, Z = -1.3) conditions. Participants whose referral included mental health were less likely to complete (69.0%, Z = 5.1) compared to those that did not (48.4%, Z = -5.1). Additionally, referrals classified as obese (61.8%, Z = 3.9) were least likely to complete the scheme, whilst overweight referrals were most likely (40.4%, Z = -3.6). There was no significant association for the number of reported health conditions. Independent samples t-tests were performed to assess differences in week 1 blood pressure between completers and non-completers. There was a significant difference between completers and non-completers for SBP only, t (587) = -3.11, p < .01, two-tailed. At week 1, completers (M = 134.20, SD = 18.01) SBP was significantly higher than non-completers (M = 129.75, SD = 16.55), eta squared = .016.

Baseline measures

A Mann-Whitney U test revealed a significant difference in the total MET-min-week^{-1} of completers (*Md* = 1386, IQR = 2574.00, n = 251) and non-completers (*Md* = 702, IQR =

2463.25, *n* = 304), *U* = 43759.50, *Z* = 2.98, *p* =.003, *r* = .13. Additional analyses revealed a significant difference in moderate MET-min-week^{-1} between completers (*Md* = 240.00, IQR = 1440.00, *n* = 251) and non-completers (*Md* = 60, IQR = 720.00 *n* = 304), *U* = 44325.00, *Z* = 3.40, *p* = .001, *r* = .14, and walking MET-min-week^{-1} between completers (*Md* = 495.00, IQR = 1188.00, *n* = 251) and non-completers (*Md* = 396.00, IQR = 1254.00 *n* = 304), *U* = 41958.00, *Z* = 2.03, *p* = .042, *r* = .08. There were no significant differences between completers and non-completers for vigorous MET-min-week^{-1} (*Md* = 0.00 *vs.* 0.00) or sitting time (mins per day) (*Md* = 360.00 *vs.* 360.00, IQR = 240.00). A chi-square test for independence revealed no significant association between completers and non-completers for IPAQ classification (i.e., low, moderate or high). Finally, a Mann-Whitney U test revealed a significant difference in the SWEMWBS scores of completers (*Md* = 26, IQR = 8, *n* = 229) and non-completers (*Md* = 23, IQR = 8, *n* = 186), *U* = 26631, *Z* =4.40, *p* <.001, *r* = .22, with completers reporting significantly higher well-being scores at week 1.

Predictors of scheme adherence

A binary logistic regression was performed to explore whether any week 1 demographic characteristics, referral characteristics, or baseline measures predicted scheme completion (Table 3). An initial test of the model was significant, X^2(38, N = 434) = 113.39, *p* <0.001, indicating that the model was able to distinguish between those that did and did not complete the scheme. This model explained 23.0% (Cox & Snell R^2) to 30.8% (Nagelkerke R^2) of the variance in scheme completion and correctly classified 72.1% of cases (compared to 55.3% of the null model). Following the removal of 1 case which was poorly explained by the model, the regression was performed again. This version of the model proved significant, X^2(N = 433) = 121.37, *p* <.001, and explained between 24.4% and 32.7% of the variance, correctly classifying 72.3% of cases. Three of the independent variables made a statistically significant

contribution to the model. Those from the least deprived deciles were most likely to complete AWL, $b = 2.83$, $p < 0.01$, $OR = 16.91$ (95% CI: 2.97, 96.18), as were those who did not report the presence of a mental health condition, $b = .85$, $p = .03$, $OR = 2.33$ 95% CI: 1.10, 4.92). Additionally, those referred to Burscough leisure site were most likely to complete AWL, $b = 2.02$, $p < 0.01$, $OR = 7.54$ (95% CI: 2.45, 23.19).

Table 3. Logistic regression to predict adherence

Predictor	B	S. E.	Wald	df	*p*	Odds Ratio	95% C.I. for Odds Ratio	
							Lower	Upper
Sex								
Male	1.00 (ref)							
Female	.03	.26	.01	1	.92	1.03	.62	.17
Age (Wald = 7.37, df = 6, sig = .29)								
18-24	1.00 (ref)							
25-34	-.83	.64	1.70	1	.19	.43	.12	1.52
35-44	-.31	.61	.26	1	.61	.73	.22	2.42
45-54	-.55	.61	.80	1	.37	.58	.17	1.92
55-64	-.45	.61	.54	1	.46	.64	.19	2.12
55-74	.20	.62	.10	1	.76	1.22	.36	4.13
75+	.37	.71	.27	1	.61	1.45	.36	5.85
Decile of Deprivation (wald = 20.46, df = 9, sig = .015*)								
1 (Most)	1.00 (ref)							
2	.10	.42	.057	1	.81	1.11	.48	2.54
3	-.22	.52	.19	1	.67	.80	.29	2.20
4	-.20	.50	.16	1	.69	.82	.31	2.18
5	.39	.61	.40	1	.53	1.47	.44	4.91
6	-.49	.58	.69	1	.41	.62	.20	1.93
7	-.56	.64	.77	1	.38	.57	.17	1.99
8	.49	.51	.94	1	.33	1.64	.60	4.46
9	.66	.59	1.25	1	.26	1.93	.61	6.07
10 (Least)	2.83	.89	10.17	1	.00**	16.91	2.97	96.18
Source of Referral								
Health professional	1.00 (ref)							
Self	.096	.267	.130	1	.719	1.101	.652	1.859
Season of Referral (wald = 3.40, df = 3, sig = .33)								
Winter	1.00 (ref)							
Spring	.47	.33	2.04	1	.15	1.60	.84	3.06
Summer	.450	.31	2.52	1	.11	1.64	.89	3.04
Autumn	.61	.42	2.13	1	.14	1.83	.81	4.14
Reported Health Conditions (wald = .32, df = 2, sig = .85)								
1	1.00 (ref)							
2	.02	.33	.00	1	.95	1.02	.54	1.94
3+	.17	.35	.23	1	.63	1.18	.60	2.34
Mental Health as a referral condition								
Yes	1.00 (ref)							
No	.85	.38	4.91	1	.03*	2.33	1.10	4.92
Primary referral condition (wald = 4.42, df = 6, sig = .62)								
Cancer	1.00 (ref)							
Cardiac	-.54	.65	.68	1	.41	.58	.16	2.10
Diabetes	-1.08	.75	2.10	1	.15	.34	.08	1.47
Mental Health	-.34	.74	.21	1	.64	.71	.17	3.03
Musculoskeletal	-.42	.69	.37	1	.54	.66	.17	2.54

Obesity	-.71	.74	.92	1	.34	.49	.12	2.10
Respiratory	-1.07	.74	2.10	1	.15	.34	.08	1.46
Leisure Site (wald = 26.23, df = 3, sig <.00)**								
Banks	1.00 (ref)							
Burscough	2.02	.57	12.41	1	.00**	7.54	2.45	23.19
Ormskirk	-.52	.44	1.41	1	.24	.59	.25	1.41
Skelmersdale	-.11	.51	.04	1	.84	.90	.33	2.44
PA (MET-min-week^{-1})								
Total	.00	.00	.86	1	.35	1.00	1.00	1.00
Vigorous	.00	.00	.40	1	.53	1.00	1.00	1.00
Moderate	.00	.00	.17	1	.68	1.00	1.00	1.00
Sitting Time								
Mins/day	.00	.00	3.49	1	.06	1.00	1.00	1.00
Blood Pressure (mmHg)								
Systolic	.01	.01	1.69	1	.19	1.01	.99	1.03
Diastolic	-.01	.01	.42	1	.52	.99	.96	1.02
Constant	-1.88	1.57	1.43	1	.23	.15		

*p< .05; **p< .01

Discussion

The aim of this study was to investigate socio-demographic patterning of those accessing and completing AWL. A secondary aim was to compare AWL with previous ERS evaluations to explore whether the anticipated additional recruitment of self-referrals within AWL was associated with different patterns of scheme engagement. The findings confirmed that a much greater percentage of participants accessed AWL relative to previous ERSs (e.g., Duda et al., 2014; Taylor et al., 2019). Nonetheless, rates of AWL uptake and completion were consistent with previous ERS evaluations, as were the demographic characteristics of scheme participants. Moreover, findings were comparable in consideration of demographic and referral characteristics associated with uptake and completion. Increasing age was positively associated with uptake and completion, with males also being more likely to complete AWL. Referrals from the most deprived areas were least likely to uptake and complete, though deprivation levels varied according to leisure site. Referral due to CVD or musculoskeletal health conditions was positively associated with uptake and completion, whereas those referred due to mental health conditions were less likely to uptake and complete AWL. A regression model identified low levels of socioeconomic deprivation, absence of a mental health condition and referral to a specific leisure site predicted completion. However, a large amount of variance in uptake and completion remained unexplained, indicating the existence of other key factors to influence AWL uptake and completion.

At 78.1%. AWL uptake is consistent with previous ERS evaluations of approximately 75 – 85% (Hanson et al., 2013; Campbell et al., 2015). Similarly, the AWL completion rate of 42.2% is generally consistent within the wide range of completion rates reported previously (Pavey et al., 2012). AWL completion was lower than that reported in Kelly et al.'s (2017) recent natural observation (i.e., 50%), but comparable with the 42.7% found by McGeechan et

al. (2018). Overall, completion rates were comparable with Hanson et al. (2013), though, their ERS was administered over a 24-week period compared to the 12-week AWL. Reasons for poorer rates of completion are difficult to accurately hypothesise. Given the most prevalent reasons for AWL dropout were loss of contact and non-attendance of 12-week assessment appointments, it is possible that the low-face-to-face contact, high autonomy structure of AWL contributed to lower levels of accountability and motivation among participants and thus, increased dropout likelihood. In addition, the option for AWL participants to access exercise facilities outside of supervised-session times may have prevented EROs from being able to identify and offer extra motivational support to participants who had recently stopped attending. In contrast, Hanson and colleague's (2013) ERSs employed a group-based delivery format which may have enabled quicker identification of participants that had stopped attending, providing opportunity for effective intervention to promote re-attendance. James and colleagues (2008) propose a need for ERSs to be flexible to accommodate those with time-constraints which prevent regular attendance of designated sessions. AWL fulfilled this recommendation by offering a high degree of flexibility in when participants could access the scheme, however, low completion rates may indicate the need for better monitoring of attendance.

As anticipated, a substantial percentage (55.2%) of participants accessed AWL via self-referral. The high prevalence of AWL self-referrals is novel relative to previous ERSs where 74-86% of referrals were initiated by a primary care organisation (Hanson et al., 2013; Kelly et al., 2017; McGeechan et al., 2018). Prior (2019) found only 44.8% of referrals accessed an ERS via a primary care referral, indicating that participants enter ERSs via an array of differing routes. Participants were not permitted to access the ERS via self-referral in Prior (2019). Previous evaluations demonstrate a positive association between ERS completion and referral

by primary (Hanson et al., 2013) and secondary (Kelly et al., 2017) care organisations, though there was no association between source of referral and uptake and/or completion for AWL. Thus, there remains no consensus regarding preferential sources of referral to predict ERS completion. Moreover, AWL's findings indicate that the traditional ERS access routes of primary and secondary care organisations may be circumvented via the inclusion of self-referral, without detriment to scheme completion rates. This may expediate the referral process, as well as alleviating undue burden from time-poor primary care services. Both James et al. (2008) and Moore et al. (2013) have questioned the extent to which ERS referrals are truly initiated by GPs. That is, whether participants are highlighting the existence of ERSs to GPs rather than the other way around. Currently, the minimal exclusion criteria for ERS participation makes it likely that many individuals are eligible to access ERSs. Therefore, rather than serving as active advocates of ERSs, referring organisations are instead reduced to gatekeepers preventing schemes from becoming overwhelmed (Din et al., 2015). Adoption of a community-based approach involving widespread promotion of ERS awareness among residents and allowing self-referral access has the potential to be a fruitful alternative to current ERS recruitment strategies. Specifically, it can be used to directly address the oft-cited criticism that GPs do not refer as often as they should due to low awareness of ERS opportunities (Morgan et al., 2016).

The mean AWL participant age of 53.8 years is consistent with previous ERS evaluations (Pavey et al., 2012; Campbell et al., 2015; Kelly et al., 2017; Steele et al., 2019), reflecting the wide age range of participants accessing ERSs. Increasing age was positively associated with AWL uptake and completion, as is typical of ERSs (Hanson et al., 2013; Campbell et al., 2015; Kelly et al., 2017). Lesser time constraints (James et al., 2008), greater appreciation of opportunities for social interaction (Tobi et al., 2012), and easier incorporation

of ERS-promoted activities into daily life (Campbell et al., 2015) are assumed reasons to account for better ERS engagement among older adults. To this extent, recommendations to improve ERS completion rates include specifically targeting ERSs at adults aged 55+ years (Hanson et al., 2013), or adapting ERS provision for younger adults (Kelly et al., 2017). Among AWL participants, completion rates were lowest among younger adults (25 – 34, 35 - 44), but not the youngest adults (18 – 24 years). These findings offer tentative support for the tailoring of ERS to older adults, yet it remains unclear why the youngest adults were more likely to complete AWL. Speculatively, it is possible that AWL EROs intuitively modified their provision in a manner that positively impacted the engagement of the youngest AWL users, though it is beyond the remit of the current study to verify whether this actually occurred. Alternatively, James et al. (2008) cite the high prevalence of older adults within ERS as a deterrent for younger participants. Here, the flexibly structured, non-group-based AWL delivery format may have afforded opportunities for the youngest adults to access the scheme at times associated with greater sociodemographic diversity.

Women accounted for 62% of AWL participants, reaffirming the tendency for more women to access ERSs than males (Tobi et al., 2012; Duda et al., 2014; Hawkins et al., 2019; Steele et al., 2019). Within traditional ERS, this increased prevalence can be attributed to a greater number of women accessing primary care services, thus enhancing the possibility of receiving a referral (James et al., 2008). Here, the ability to access AWL via self-referral removed this perceived barrier by allowing men to bypass prior contact with a primary care service. Accordingly, the greater volume of women within AWL suggest other salient factors may contribute to sex differences in relation to ERS uptake. Furthermore, though ultimately more women accessed AWL, in contrast to Hanson et al. (2013) and Moore et al. (2013), women were not significantly more likely than males to uptake AWL. Women were also less

likely to complete AWL. Lower likelihood of ERS completion among women is consistent with Pavey et al. (2012), Moore et al. (2013), and Kelly et al. (2017), though others have reported no association between sex and ERS completion (Hanson et al., 2013; Sowden et al., 2008; James et al., 2008). Consequently, there remains little definitive consensus regarding the association between sex and ERS completion.

Participants from the most socioeconomically deprived areas were least likely to uptake and complete AWL, whilst those from the least socioeconomically deprived areas were most likely. This pattern is largely consistent with previous evaluations for uptake (Sowden et al., 2008; Murphy et al., 2012, Hanson et al., 2013), and completion (Gidlow et al., 2007; Hanson et al., 2013). However, Sowden and colleagues (2008) found no association between socioeconomic deprivation and completion. Levels of socioeconomic deprivation varied substantially across individual AWL sites. Fifty-eight percent of participants referred to Skelmersdale were from the most socioeconomically deprived deciles, whereas less than 7% of participants from the remaining 3 sites were from similarly socioeconomically deprived areas. Consistent with Hanson et al. (2013), leisure site predicted greater likelihood of AWL completion. Individual processes within specific sites may contribute towards variable rates of ERS completion, yet the underlying reasons for between-site differences are likely to be complex and multifaceted (Hanson et al., 2013). Din et al. (2015) attributed variable between-site ERS engagement to contextual differences in how schemes were set up, advertised and communicated to general practices, rather than socioeconomic deprivation levels. Notwithstanding, the extent of the discrepancy in socioeconomic deprivation levels between AWL sites cannot be understated. Here, 32.9% of AWL participants were from the most socioeconomically deprived areas. In comparison, 6.5%, 23.1%, and 59.7% of participants were from similarly socioeconomically deprived areas in the evaluations by Hawkins et al.

(2019), Hanson et al. (2013) and Parretti et al. (2017), respectively. The vast heterogeneity of socioeconomic deprivation levels between different ERS inhibit the ability to accurately critically appraise the potential association between socioeconomic deprivation and ERS uptake and completion. Further, contextual scheme differences, such as the charging of a nominal fee for ERS sessions in Hanson et al. (2013), may significantly influence rates of scheme uptake and completion among the most deprived areas. Moreover, the use of IMD as a proxy measure of area-level deprivation represents a common limitation among this study, Hawkins et al. (2019; Welsh IMD), Hanson et al. (2013) and Parretti et al. (2017). Thus, it is possible that participants may have been incorrectly classified on the basis of their residential status as opposed to their individual-level financial circumstances.

The most common primary reason for referral among AWL participants was CVD. CVD is a prevalent primary reason for referral within ERSs (James et al., 2008; Hanson et al., 2013; McGeechan et al., 2018), though overweight/obesity is frequently cited as the most common (Tobi et al., 2012; Duda et al., 2014; McGeechan et al., 2018; Taylor et al., 2019). This difference may be due to AWL's large-scale inclusion of self-referrals and discrepancy between primary/secondary care and self-referral forms. Primary/secondary care referral forms included overweight/obesity as a distinct primary reason for referral, whereas self-referral forms and subsequent questionnaires completed during ERO-led assessment appointments did not. Therefore, there was reduced likelihood of classifying a participant's primary reason for referral as overweight/obesity among self-referrals. Notwithstanding, 82.1% of AWL referrals were identified as overweight (32.3%) or obese (49.8%). These figures are consistent with Parretti et al. (2017), albeit with a different distribution of overweight (21.8%) and obese (69.5%) participants. Overall, the distribution of primary reason for referral among AWL participants was consistent with previous ERS evaluations. Uptake to AWL was highest among

those referred due to musculoskeletal health and CVD, and lowest for those referred due to obesity and mental health conditions. AWL participants referred due to musculoskeletal health and CVD were also more likely to complete compared to those referred due to mental health conditions. However, like Hanson et al. (2013), primary reason for referral was not a significant predictor of AWL completion. The absence of mental health as an identified health condition positively predicted AWL completion. Collectively, these findings are consistent with previous ERS evaluations to report a positive association between ERS completion and referral due to a physical, rather than mental, health condition (Crone et al., 2008, Murphy et al., 2012; Kelly et al., 2017; Tobi et al., 2017). Consequently, there exists apparent consensus that referral due to a mental health condition is associated with poor ERS completion. An array of interacting factors, including age, socioeconomic deprivation, and weight status, may contribute to poorer rates of ERS completion among those referred due to a mental health condition. For instance, Crone et al. (2008) and Tobi et al. (2012) identified those referred to ERS due to mental health to be significantly younger. Given the consistent association between increasing age and ERS completion, it is not clear whether dropout may primarily occur as a function of younger age, or the presence of a mental health condition. Similarly, associations between poorer mental health and socioeconomic deprivation (Meich et al., 1999), and overweight/obesity (Parretti et al., 2017), make it difficult to determine the primary catalyst for dropout.

Further, an abundant number of ERS participants present multi-morbidity of referral conditions (Prior et al. 2019). This creates an inherent challenge to accurately categorise participants according to their primary reason for referral (Rowley et al., 2019). The tendency for different researchers to use contrasting primary reason for referral classification systems adds an additional layer of subjectivity which hinder accurate comparisons between ERS evaluations. The evaluations by Mills et al. (2012), Kelly et al. (2017) and McGeechan et al.

(2018) employed related but distinct systems to classify participant's primary reason for referral. This study utilised a system that differs further from those described above. Here, the wording of AWL's pre-existing medical questionnaire dictated primary reason for referral classification. Additionally, the prevalence of individual primary reasons for referral dictates inclusion or exclusion within subsequent analyses, as do the subjective decisions of individual researchers. For instance, Prior et al. (2019) include multi-morbidity as a distinct reason for referral. In contrast, this study opted to classify primary reason for referral according to the perceived severity of reported conditions. Adoption of this process, in accordance with ERO guidance, facilitated direct comparison of AWL uptake and completion between participants with distinct reasons for referral. However, it is possible that the use of this approach may have led to subjective classification errors. The inherent subjectivity involved in providing primary reason for referral classifications for ERS participants may contribute to the lack of an identified association between primary reason for referral and ERS uptake and completion (Hanson et al., 2013). AWL completers reported greater PA levels at baseline compared to non-completers. This is consistent with Campbell et al. (2015), though in contrast to Moore et al. (2013) who found those with higher pre-ERS PA levels to be more likely to dropout prior to ERS completion. AWL completers also reported significantly higher SBP at baseline. though SBP was not a significant predictor of completion. The higher SBP reported by completers is likely a reflection of the high prevalence of CVD as a primary reason for referral and the related positive association between referral due to CVD and AWL completion.

As elsewhere, the predictor variables included in the regression model only minimally increased accuracy (James et al., 2008; Hanson et al., 2013). Following James et al. (2008), Hanson et al. (2013), Kelly et al. (2017), and Prior (2019), this study presents the latest evidence to employ regression modelling of ERS completion. To date, age and sex are the only

regression variables consistently included within each respective evaluation. Previous evaluations include further variables, such as ethnicity (James et al., 2008), leisure site (Hanson et al., 2013), and season of referral (Prior et al., 2019) on an inconsistent basis. Variability in analysis and reporting methods hinder the ability to identify salient factors linked to ERS uptake and completion. As highlighted by Tobi et al. (2012), ERSs operate in differing social and environmental contexts and are, therefore, not strictly comparable. Acutely, ERSs operate in a landscape where heterogeneity may exist in respect of the strategic aims of ERS providers, delivery methods and eligible referral criteria (Tobi et al., 2017; Henderson et al., 2018). This contributes to substantial variability among participants of different ERSs in terms of socioeconomic deprivation, age, and ethnicity, and limits the utility of cross-scheme comparison. For instance, rates of AWL uptake and completion according to ethnicity are not included in this study as AWL questionnaires did not include them due to the assumed proportionate ethnic distribution of AWL participants relative to the principally White British West Lancashire area. This data is comparably absent within Hanson et al. (2013) and Kelly et al. (2017), which were conducted within North East England, an area with comparable ethnic diversity to West Lancashire. Where reported, evaluations reflect the assumed bias towards White British adults, with 97.3% and 96.2% White British participants reported by McGeechan et al. (2018), and Hawkins et al. (2019), respectively. In contrast, only 72.8% of participants were White British in Parretti et al. (2017), and 69.4% in James et al. (2009). Further, James and colleagues (2009) reported participants in a 'mixed' category to be more likely to complete the ERS and more likely to achieve a reduction in body mass. In this respect, ethnicity is a prime example to highlight the difficulty and validity of cross-scheme comparisons given the extent to which participants may differ between schemes.

There are three principal limitations of this study. Firstly, the study relied on the use of secondary data provided by primary and secondary care organisations, and EROs. Data collected during initial ERO-led assessment appointments served the dual purposes of assessing participant eligibility for AWL and highlighting salient medical conditions that may impede participant's ability to perform some forms of exercise rather than others. This holistic approach to the recording of participant's medical history resulted in the need for subjective interpretation to assign participant's primary reason for referral in some cases. Utilisation of secondary data also required the lead researcher to relinquish control of preferred data collection measures and reporting procedure (Vartanian, 2011). Subsequently, data collection measures proposed by the research team had to be vetted and approved by AWL providers prior to implementation. This led to rejection of a proposed measure intended to provide more in-depth data on depression, anxiety and stress levels of participants enrolling to AWL. Secondly, the use of secondary data collection prohibits detailed understanding of why data may be missing (McKnight & McKnight, 2011). The extent of missing weight and well-being data precluded the inclusion of BMI and SWEMWBS within the regression model. When queried by the lead researcher, EROs indicated that some participants declined weight measurement, however, the degree to which this contributed to the volume of missing weight data is unknown. Notwithstanding, the use of secondary data represented a time and cost-effective strategy to facilitate access to a much larger data set than would otherwise be possible (Smith, 2008). Thirdly, failure to record AWL participant adherence data may have contributed to classification error (Shore et al., 2019). Participants were classified as completers if they attended an assessment appointment at t1 and t2. However, this fails to account for the number of AWL sessions participants may have attended between these timepoints. Consequently, participants who scarcely attended AWL sessions may be classified as completers, whereas

participants who attended AWL frequently but failed to attend the t2 assessment appointment were not.

Conclusion

This study explored overall uptake and completion rates of AWL, as well as participant demographic and referral characteristics associated with increased likelihood of uptake and/or completion. The evaluation confirms AWL to be accessed by a much higher prevalence of self-referral than noted within previous ERS evaluations. Notwithstanding, the uptake and completion rates of AWL are comparable with previous evaluations, as is the sociodemographic patterning of AWL participants. AWL uptake is more likely among older adults and completion more likely among men and those referred due to a physical, rather than mental, health condition. Additionally, those living in areas of high socioeconomic deprivation are less likely to uptake or complete. Currently, providers and commissioners may benefit from ensuring delivery mechanisms are tailored to the specific communities where ERSs take place. Moving forward, there remains a need to explore factors associated with ERS uptake and completion that go beyond demographic characteristics of ERS users, to further understanding of *why* participants may or may not complete.

Thesis study map

Study	Objectives and Key Findings
Study One – Uptake and completion rates of AWL: Evidence from a self-referral friendly ERS	**Objectives** - Explore rates of AWL uptake and completion. - Explore demographic and referral characteristics of those who accessed AWL. **Key Findings** - Rates of AWL uptake and completion were consistent with previous ERSs despite the considerably greater prevalence of self-referrals. - Demographic patterning of AWL participation was comparable with previous ERSs.
Study Two – Physical, behavioural and well-being outcomes associated with AWL completion	**Objectives** - Investigate physical, behavioural and well-being outcomes associated with AWL completion. - Explore potential differences in physical, behavioural and well-being outcomes according to primary referral condition.
Study Three – Facilitators and barriers to AWL completion: A needs analysis	
Study Four – Optimizing peer support in AWL: AWL client and stakeholder perspectives on peer recruitment and implementation	
Study Five - Acceptability of the AWL peer intervention: Evidence of promise and lessons for the future	

Chapter 5: Physical, Behavioural and Well-being outcomes associated with AWL completion

Introduction

In their seminal review, Pavey and colleagues (2011) found weak evidence for a short-term increase in physical activity (PA) following ERS completion, and no association between ERS completion and improved health and well-being. A plethora of subsequent evaluations underline Pavey et al's. (2011) conclusions, with ERS completion indeed positively associated with only short-term marginal increases in PA (Hanson et al., 2013; Campbell et al., 2015; Parretti et al., 2017; McGeechan et al., 2018; Rowley et al., 2019b), which are unlikely to yield meaningful health and well-being improvements (Rowley et al., 2019b; Wade et al., 2020). Comparably, where ERS completion is associated with positive physical outcomes, such as reduction in BMI (Duda et al., 2014; Webb et al., 2016), and blood pressure (Mills et al., 2012; Webb et al., 2016), the size of the reduction is considered insufficient to meaningfully enhance health (Wade et al., 2020).

Notwithstanding, these conclusions are drawn from analyses of complete samples, without exploration of potentially variable health and well-being outcomes relative to distinct ERS sub-populations (Pavey et al., 2011). Existing guidance state sedentary or 'inactive' individuals with an existing medical condition are eligible to take part in ERSs (NICE, 2014). Thus, unchanging from its initial inception, ERS guidance remains broad-scale, ill-defined and inclusive (NICE, 2014; Oliver et al., 2016). Consequently, ERS samples comprise participants who vary extensively by age, sex, reason(s) for referral, and to a lesser extent, socioeconomic deprivation and ethnicity (Pavey et al., 2011). Accordingly, recognition of ERS as ineffective PA interventions may be premature, as important health and well-being outcomes may be achieved among distinct sub-populations but concealed within complete sample analyses. Further, the vast sociodemographic heterogeneity of ERS participants hinder evaluations by pre-empting the identification and use of representative health and well-being outcomes

(Dugdill, Graham & McNair, 2005). To date, BMI and blood pressure reduction remain commonly used outcomes to appraise the 'success' of ERSs (e.g., Wade et al., 2020). However, within current eligibility criteria, it is possible for individuals presenting healthy BMI and blood pressure to access ERSs, thus potentially confounding investigation of an association between ERS completion and these markers of improved physical health. This argument does not suggest BMI and blood pressure to be inappropriate outcomes within an ERS context, rather, that their appropriateness may vary according to key characteristics of ERS participants. Similarly, it is fundamentally imprecise to describe the marginal PA increase associated with ERS completion as 'insufficiently meaningful'. Marginal PA increases can yield abundant health and well-being improvements among the least physically active (McKinney et al., 2016; Wafsy & Baggish, 2016), which ERSs are specifically designed to target. Moreover, analyses of complete ERS samples belie interpersonal differences in physical fitness and capabilities linked to age and/or reason(s) for referral, which may influence the extent to which health related improvements may be achieved.

Positively, there is burgeoning exploration of ERS outcomes according to salient participant characteristics, such as weight status (Parretti et al., 2017) and reason(s) for referral (Murphy et al., 2012; Prior, 2019). For instance, after stratifying ERS participants by BMI classification, Parretti et al. (2017) found overweight participants reported a higher post-ERS PA volume of 142 mins/week relative to those classified as obese (97 mins/week). Parretti et al's. (2017) findings may indicate ERSs are better suited towards overweight rather than obese individuals. Alternatively, it may be considered that the relative increase in PA identified by Parretti et al. (2017), though differing in volume, may be considered comparably successful given the difference in weight status. Currently. there is little consensus regarding the association between ERS completion and primary reason(s) for referral. Murphy et al. (2012)

identified referral due to cardiovascular disease (CVD), rather than mental health, to be associated with a greater ERS-related PA increase and higher overall PA. In contrast, McGeechan et al. (2018) and Prior (2019) found no association between PA and reason for referral. Notwithstanding, Prior (2019) highlighted differences in ERS-related PA increases among specific referral conditions, with those referred due to 'diabetes', or 'CVD' achieving a greater PA increase than those referred due to a 'respiratory' or 'musculoskeletal' condition. Further, Prior (2019) identified significant differences in improvements in BMI, blood pressure and well-being among participants with different primary reasons for referral. For instance, participants referred due to a 'mental health issue', reported non-significant changes in BMI and blood pressure, though critically, experienced the largest significant increase in well-being relative to other referral conditions (Prior, 2019). Comparably, ERS completion is associated with reductions in depression for those referred due to mental health conditions and improvement in CVD risk factors if referred for CVD (Rowley et al., 2019; Buckley et al., 2019). Thus, ERS completion can contribute towards meaningful, condition-specific improvements in health and well-being among distinct sub-populations. Continued exploration of ERS outcomes according to reason(s) for referral will facilitate greater understanding of the ways in which ERS completion may contribute towards enhanced health and well-being. Hence, this study had two primary aims: (1) to investigate physical, behavioural and well-being outcomes associated with AWL completion, and (2) to explore differences in physical, behavioural and well-being outcomes according to reason(s) for referral.

Methods

Study design

This study was a short-term outcome evaluation of the AWL ERS (AWL). AWL gave permission to access physical, behavioural and well-being data at weeks-1 and 12.

Data collection

Data were available for all AWL completers between May 2018 and January 1st, 2020. To be classified as a completer, participants must have; (1) a referral or self-referral to AWL and attended an initial assessment appointment (week 1) with an exercise referral officer (ERO), and (2) attended a follow-up assessment appointment at the end of AWL (week 12). During the initial assessment appointment, EROs collected routine demographic information including age and sex, performed a brief physical assessment pertaining to stature (m), weight (kg), and blood pressure (mmHg), and asked participants to complete the IPAQ-E and SWEMWBS questionnaires. Participants completed the same physical assessment and questionnaires at a 12-week follow-up assessment. An in-depth description of AWL delivery and study design is provided in Chapter 1.

Data analyses

All data were transferred into the data analysis software SPSS (IBM SPSS Statistics for Macintosh, version 25.0. Armonk, NY: IBM Corp). Shapiro-Wilk tests, as well as inspections of histograms and q-q plots were used to assess normality and screen for outliers for all continuous variables. The continuous variables included in analyses were; scheme duration (weeks from assessment appointment to completion), BMI (weeks 1 & 12), systolic blood pressure (weeks 1 & 12), diastolic blood pressure (weeks 1 & 12), total, vigorous, moderate and walking MET-min-week^{-1}, moderate-to-vigorous PA (MVPA; mins/week), sitting time

(mins per day), and SWEMWBS (total; weeks 1 & 12). Median (*Md)* and interquartile range (*IQR)* were reported for non-normally distributed variables are presented for all non-normally distributed variables. For non-normally distributed variables, the Wilcoxon Signed Rank Tests assessed differences between week 1 and 12 outcomes, and Kruskal-Wallis Tests were used to explore differences in continuous variables across multiple categories. Where appropriate, follow-up Mann-Whitney U Tests explored the differences between categories (with Bonferroni adjustment, $p = 0.017$). Mean (M) and standard deviation (SD) were reported for normally distributed variables. Paired-samples t-tests explored the differences between week 1 and week 12 outcomes for normally distributed variables. Effect size magnitude was recognised as 0.01 for a small effect, 0.06 = moderate effect, and 0.14 a large effect (Cohen, 1988). The above analytic procedure was repeated, whilst stratifying participants by primary referral condition to investigate variability in physical, behavioural, and well-being outcomes in discrete sub-populations.

Results

Two hundred and seventy-three participants (152 female) completed AWL between May 2018 and January 1st, 2020, with scheme participation ranging from 7 to 70 weeks (*Md* = 14 weeks, *IQR* = 4). Participants had a mean age of 59.97 ± 15.12 years and were predominantly referred due to CVD (*n* = 72; 28.8%) or musculoskeletal (*n* = 54; 19.9%) health conditions. Upon entry to the scheme 80.5% of participants were classified as either overweight (*n* = 87; 40.5%) or obese (*n* = 40.0%), whilst 36.3% (*n* = 91) were classified as engaging in 'low', 39.0% (*n* = 98) 'moderate', and 24.7% (*n* = 62) as 'high' weekly PA using IPAQ-E criteria. PA guidelines of ≥150 MVPA mins/week were achieved by 40.2% of participants, prior to their enrolment to AWL.

Wilcoxon Signed Ranks tests determined post-scheme changes in BMI, PA and well-being (SWEMWBS). As displayed below (Table 4) there were significantly positive changes for each of these outcomes. Participants achieved a significant BMI reduction at week 12, with follow-up analyses identifying a significant reduction for overweight and obese participants only. Significant changes in PA volume were evidenced as MET-min-week^{-1} significantly increased across all intensity levels. Significant reductions in daily sitting time were also observed. Upon AWL completion, 19.1% (*n* = 44) of participants were classified as performing 'Low', 25.2% (*n* = 58), 'Moderate', and 55.7% (*n* = 128) as 'High' levels of weekly PA at week 12. Corresponding significant increases in MVPA were identified, with 72.1% (*n* = 168) reporting meeting recommended guidelines of 150 mins/week MVPA at week 12. A McNemar's test indicated that this represented a significant increase from week 1 ($p < .01$). Participants also reported significantly greater SWEMWBS scores at week 12, indicating a significant improvement in psychological well-being. Paired samples t-tests evaluated pre-post blood pressure (BP) changes. There was a significant decrease in systolic BP (SBP) from

baseline (134.31 ± 18.69 mmHg) to week 12 (131.19 ± 17.56 mmHg), t (201) = 2.80, p = .006. The mean decrease was 3.12, eta squared = .13. However, there was no significant change in diastolic BP (DBP) at week 1 (M = 81.29, SD 10.79) and week 12 (M = 80.11, SD = 10.97), t (202) = 1.79, p = .08 (two-tailed).

Table 4. Median (IQR) Physical, behavioural and well-being outcomes at AWL weeks 1 and 12.

Measure	**Week 1**		**Week 12**		***p***	***r***
	Median	IQR	Median	IQR		
BMI (kg/m^2)						
Total (n = 204)	28.37	(7.16)	27.92	(6.29)	< .01	.31
Healthy weight (n = 40)	23.05	(2.40)	22.73	(2.67)	.71	
Overweight (n = 79)	27.24	(2.04)	27.14	(1.86)	< .01	.36
Obese (n = 76)	34.70	(8.73)	33.52	(9.46)	< .01	.41
PA (MET-min-week^{-1}) (n = 251/230)						
Total	1386.00	(2574.00)	3397.50	(4969.50)	< .01	.43
Vigorous	0.00	(0.00)	240.00	(1500.00)	< .01	.35
Moderate	240.00	(1440.00)	1200.00	(260.00)	< .01	.37
Walking	495.00	(1188.00)	990.00	(2169.75)	< .01	.25
Sitting time (n = 230)						
Mins/day	360.00	(240.00)	240.00	(180.00)	< .01	.40
MVPA (n = 230)						
Mins/week	70.00	(360.00)	360.00	(842.50)	<.01	.41
SWEMWBS (n = 214)						
Total	26	(8)	30	(7)	< .01	.42

r = effect size

Outcomes by primary referral condition

Wilcoxon Signed Ranks Tests determined the variability in pre- and post-scheme changes in physical health outcomes by primary reason for referral (Table 4). All referral categories were classified as overweight or obese at week 1. With the exception of those referred due to mental health and musculoskeletal health, all categories demonstrated significant reductions in BMI at week 12. Those referred due to obesity saw the greatest reduction of 0.89kg/m^2, whilst those referred due to mental health were the only category to report a BMI increase at week 12. A series of paired-samples t-tests revealed AWL completion

to be less successful for facilitating a reduction in BP. Although many categories reported a reduction in SBP and/or DBP at week 12, only those referred due to diabetes (eta squared = .39) and respiratory (eta squared = .22) health conditions reported a significant reduction in SBP.

Table 4. Median (IQR) BMI (kg/m^2) and Mean (SD) systolic (SBP) and diastolic (DBP) blood pressure (mmHg) at AWL weeks 1 and 12 by primary referral condition.

Referral reason	**Week 1**		**Week 12**		***p***	***r***
	Md/M	**IQR/SD**	**Md/M**	**IQR/SD**		
Cancer						
BMI (n = 11)	28.72	(10.40)	27.85	(8.00)	.01*	.53
SBP (n = 14)	140.08	(19.59)	137.15	(15.76)	.53	
DBP (n = 14)	83.54	(13.15)	80.68	(8.45)	.31	
CVD						
BMI (n = 56)	27.87	(5.38)	27.58	(4.42)	.01**	.35
SBP (n = 62)	137.77	(20.55)	134.44	(17.50)	.16	
DBP (n = 62)	79.16	(10.70)	78.02	(10.35)	.33	
Diabetes						
BMI (n = 17)	30.37	(8.85)	29.41	(8.10)	.02*	.41
SBP (n = 16)	145.93	(13.51)	136.07	(11.99)	.01*	
DBP (n = 16)	87.20	(10.07)	83.73	(11.76)	.26	
Mental Health						
BMI (n = 32)	26.90	(6.93)	27.10	(6.70)	.72	
SBP (n = 31)	125.21	(13.98)	124.07	(17.64)	.62	
DBP (n = 31)	78.17	(8.99)	78.90	(7.62)	.69	
Musculoskeletal						
BMI (n = 39)	27.85	(5.96)	27.85	(5.37)	.07	
SBP (n = 41)	133.15	(18.38)	132.78	(17.97)	.88	
DBP (n = 41)	82.90	(8.87)	83.59	(11.26)	.61	
Obesity						
BMI (n = 17)	37.58	(8.91)	36.69	(9.81)	.01**	.58
SBP (n = 15)	138.43	(16.52)	133.21	(11.27)	.27	
DBP (n = 15)	89.86	(7.81)	88.64	(7.79)	.61	
Respiratory						
BMI (n = 19)	29.34	(7.91)	28.76	(7.49)	.02*	.39
SBP (n = 17)	130.76	(14.53)	126.29	(16.77)	.05*	
DBP (n = 17)	77.12	(10.74)	74.82	(14.05)	.25	

r = effect size

With the exception of those referred due to cancer, all categories reported an increase in MET-min-week^{-1} and a decrease in sitting time (mins/day) (Table 5). The greatest increases

in total MET-min-week^{-1} were achieved among those referred due to CVD or obesity, whilst the greatest reduction in sitting time was observed among those referred due to diabetes or obesity. Comparably, with the exception of cancer, all referral categories reported a significant increase in SWEMWBS scores, with those in the mental health category demonstrating the greatest increase in well-being (Table 6).

Table 5. Median (IQR) total PA (MET-min-week^{-1}) and sitting time (mins/day^{-1}) at AWL weeks 1 and 12 by primary referral condition.

Referral reason	**Week 1**		**Week 12**		***p***	***r***
	Median	IQR	Median	IQR		
Cancer (n = 16)						
Total PA	1486.00	(2314.25)	2455.50	(2841.75)	.17	
Sitting time	360.00	(285.00)	360.00	(120.00)	.48	
CVD (n = 67)						
Total PA	1671.00	(2322.00)	4212.00	(5628.00)	.01**	.51
Sitting time	360.00	(240.00)	300.00	(240.00)	.01**	.40
Diabetes (n = 17)						
Total PA	1180.50	(4467.00)	2940.00	(5060.00)	.02*	.42
Sitting time	450.00	(292.50)	300.00	(420.00)	.02*	.42
Mental Health (n = 31)						
Total PA	1386.00	(1761.00)	3640.00	(5221.00)	.01**	.46
Sitting time	300.00	(240.00)	240.00	(120.00)	.01**	.46
Musculoskeletal (n = 48)						
Total PA	1190.50	(2631.75)	3001.50	(4005.50)	.01**	.40
Sitting time	330.00	(240.00)	240.00	(172.50)	.01**	.45
Obesity (n = 16)						
Total PA	471.00	(2517.75)	4004.00	(6210.00)	.01**	.47
Sitting time	390.00	(127.50)	255.00	(180.00)	.01**	.51
Respiratory (n = 19)						
Total PA	1404.00	(4393.00)	3990.00	(8529.00)	.01**	.44
Sitting time	360.00	(210.00)	300.00	(360.00)	.01**	.45

r = effect size

Table 6. Median (IQR) SWEMWBS scores at weeks 1 and 12 by primary reason for referral.

Referral reason	**Week 1**		**Week 12**		***p***	***r***
	Md	IQR	Md	IQR		
Cancer (n = 12)	28	(7)	31.00	(8)	.11	
CVD (n = 63)	28	(7)	32.00	(8)	.01**	.40
Diabetes (n = 15)	25	(7)	30.00	(5)	.02*	.44
Mental Health (n = 31)	21	(5)	27.00	(8)	.01**	.52
Musculoskeletal (n = 45)	26	(6)	29.00	(9)	.01**	.36
Obesity (n = 16)	25	(8)	30.00	(7)	.01**	.62
Respiratory (n = 18)	29	(9)	32.00	(7)	.01**	.44

r = effect size

Discussion

AWL completion was associated with significant reductions in BMI, SBP, and sitting time (mins/day), as well as significant increases in PA and well-being. These positive outcomes were largely consistent across different primary reason for referral categories. Comparison of AWL outcomes relative to previous ERS evaluations are presented to contextualise the impact of AWL completion on participant physical health, PA behaviour, and well-being. Potential reasons for varying outcomes between ERSs are highlighted and implications for future research discussed.

Participants achieved a significant BMI reduction of 0.45 kg/m^2 upon AWL completion. This is consistent with the 0.55 kg/m^2 reduction reported in Wade et al's. (2020) recent evaluation of routine ERS outcomes using the national referral database (NRD) (Steele et al., 2019). The magnitude of BMI reduction achieved by AWL participants is lower than the 0.68kg/m^2 reported in McGeechan et al. (2018), but higher than those reported by Webb et al. (2016) and Duda et al. (2014). In line with Wade et al's (2020) conclusions, it is unlikely that BMI reduction of this size would facilitate 'meaningful' changes in health and well-being. A much higher reduction is necessary to constitute meaningful health improvement in respect of lower mortality risk (Klenk et al., 2014). Notwithstanding, there are inherent limitations of this interpretation within the context of ERSs. Firstly, it may be unfeasible to assume participants are able to achieve 'meaningful' BMI reduction via engagement in a short-term (i.e., 8-12 week) ERS. The BMI reduction reported here over a 12-week period represents a positive start towards a more active lifestyle for AWL participants that, if maintained, can lead to longer-term health gains. Prior et al. (2019) reported 1.28 kg/m^2 BMI reduction at week 52 following completion of a 24-week ERS. This is a significant improvement to the 1.02 kg/m^2 BMI reduction reported immediately post-scheme within Prior (2019), supporting the potential for

ERS completion to facilitate ongoing BMI reduction over time. In contrast, McGeechan et al. (2018) found a large significant BMI reduction (-8.4 kg/m^2) associated with completion of a 12-week ERS, though reported a comparably high BMI increase at 24-week follow up (+6.6 kg/m^2). Notwithstanding, the extent of BMI reduction reported by McGeechan et al. (2018) is anomalous among ERS literature. It is unclear why McGeechan et al's. (2018) ERS proved so effective at facilitating BMI reduction over a 12-week period. It is worth noting that the 24-week BMI reported by McGeechan et al. (2018) still represents a 1.7 kg/m^2 reduction compared to baseline. Ultimately, as this study was unable to report long-term follow-up outcomes it is not possible to determine long-term impact of AWL engagement on BMI.

Secondly, providing BMI outcomes for complete ERS samples may fail to appropriately recognise the heterogenous nature of ERS participants. Characteristically, an overwhelming majority of ERS participants are either overweight or obese (Hanson et al., 2013; Parretti et al., 2017). Yet, BMI reduction among ERS participants varies according to BMI classification and primary reason(s) for referral (McGeechan et al., 2018; Prior, 2019). Both of these trends are replicated within the AWL evaluation. Within AWL, BMI reduction varied substantially according to participant's classification as overweight (0.1kg/m^2) or obese (1.2kg/m^2). These findings indicate AWL completion was more successful for facilitating weight loss among obese participants, replicating Parretti et al. (2017). Parretti and colleagues (2017) is a re-analysis of an RCT conducted by Duda et al. (2014), whilst stratifying participants according to BMI status. However, the differences observed within Parretti et al. (2017) were reported as reductions in mass (kg) rather than BMI (kg/m^2), and greater weight reduction may be expected within obese populations. Further, BMI reduction among AWL participants differed according to primary reason for referral, with referral due to diabetes associated with a 1.0kg/m^2 reduction relative to a 0.2kg/m^2 increase among those referred due

to mental health. The baseline BMI for the mental health category was the lowest among all referral categories, albeit participants within this category were still classified as overweight. Lower BMI at baseline may indicate that weight loss was not a primary motivation for entering AWL for those referred due to a mental health condition, potentially rendering BMI reduction as less likely to be achieved. Taken collectively, these findings highlight the importance of stratifying participants according to salient demographic characteristics, such as weight status and primary reason for referral. Continued exploration in this domain is necessary to enable refinement and evolution of ERS evaluation practices, thus facilitating better understanding of the health enhancing benefits associated with ERS completion (Pavey et al., 2011). Moreover, greater clarity is needed regarding what constitutes a realistic, 'meaningful' reduction among ERS participants, as the current interpretation remains contentious (Ryan & Hockey, 2017).

The significant reduction in SBP achieved by AWL completers is in contrast to Pavey et al's. (2011) review, but consistent with more recent ERS findings (Mills et al., 2012; Webb et al., 2016; Wade et al., 2020). The size of the SBP reduction for the whole sample (3.12 mmHg) was comparable to that identified by Wade and colleagues (2020: 2.95 mmHg). Bundy et al. (2017) identify SBP of 120 to 124 mmHg provides the greatest reduction for CVD risk and all-cause mortality. Thus, despite the stated reductions, the baseline group means of 131.70 mmHg in Wade et al. (2020), and 134.31 mmHg here indicate scheme completion to be insufficient to yield meaningful improvements for health. Notwithstanding, prior complete sample analyses of ERS have failed to account for natural variation in SBP according to age and primary reason for referral, with elevated SBP associated with increased age and diabetes (James et al., 2014). Following sub-population analysis, AWL participants achieved a reduction in SBP across each primary reason for referral category, with significant reductions for those referred due to diabetes or respiratory health conditions. The magnitude of reduction

varied considerably according to primary reason for referral, ranging from 0.37 – 9.68 mmHg for musculoskeletal health and diabetes, respectively. Further, the variance in baseline SBP was most apparent between mental health (125.2 mmHg) and diabetes (145.9 mmHg) categories. These are important considerations given current contention surrounding optimal SBP for those with diabetes (Papadopoulou et al., 2018), with estimates varying from <130 - <140 mmHg. Accordingly, the reported reduction in SBP for those with diabetes may represent a meaningful health improvement. Similarly, despite those referred due to mental health achieving only a 1.14 (mmHg) reduction in SBP, this was sufficient to bring them close to the optimal range proposed by Bundy et al. (2017) and may be associated with reduced CVD risk and all-cause mortality. In contrast to Wade et al. (2020), there were no significant differences in DBP at week 12. Reductions in DBP were observed for AWL participants referred due to cancer, CVD, diabetes, obesity and respiratory health conditions, though none were significant.

AWL completers reported 1386 total MET-min-week^{-1} at baseline. In comparison to NRD data (Steele et al., 2019), this is higher than the reported mean of 1081 MET-min-week^{-1}, though within the range reported by individual ERS included within the database (537 – 3244 MET-min-week^{-1}). Participants reported significantly greater PA levels upon AWL completion. There were significant increases in MET-min-week^{-1} for total PA, as well as individual increases in vigorous and moderate intensity PA, and walking. Participants reported a total MET-min-week^{-1} increase of 2011.5 at week 12, with the most prominent increase observed for moderate intensity PA. The increase in total MET-min-week^{-1} is considerably larger than that previously reported by studies using the IPAQ (Rowley et al., 2019b). Rowley and colleagues (2019b) utilised the NRD to explore pre-post ERS changes in MET-min-week^{-1}, reporting a mean increase of 540 MET MET-min-week^{-1}, most of which also occurred within the moderate intensity threshold. However, as Rowley et al's. (2019b) work comprises an

evaluation of 12 individual ERSs contained within the NRD, and demonstrable variation evident among the included schemes (Steele et al., 2019), it is not appropriate to directly compare the findings of this study with those of Rowley and colleagues (2019b).

Notwithstanding, the MET-min-week^{-1} increase reported here is also larger than those reported by Webb et al. (2016) (+296 MET mins/week at 8 weeks), and Martin-Borras et al. (2018) (+1667 MET-min-week^{-1} at 12 weeks). Use of the IPAQ-E in the current study may have contributed to the higher MET-min-week^{-1} observed among AWL completers. IPAQ-E is recommended for use in adults aged 65≥ years, whereas the original and short-form IPAQ is intended for those aged 15- 69 years. Scoring procedure among the different IPAQ versions is consistent, as is the overall question structure as participants are asked to self-report time spent sitting, walking, and performing moderate and vigorous intensity PA over the last 7-day period. Moderate and vigorous intensity PA is defined identically among different IPAQ versions, however, there are slight differences among the activities provided as examples of moderate and vigorous intensity activity. In this regard, 'doubles tennis' is included as an example of moderate intensity activity as part of the IPAQ short form, though is not included within IPAQ-E. Conversely, 'swimming or other fitness activities' are included as part of IPAQ-E but not included within IPAQ-short form. The provided examples within IPAQ are fundamentally arbitrary as any activity may be performed at different levels of intensity, however, the use of the IPAQ-E within the AWL evaluation is novel and may have contributed to the observed higher MET-min-week^{-1} relative to the highlighted studies. Notwithstanding, key methodological differences between AWL and these studies provide alternative explanations for the discrepant findings. Firstly, prospective participants in both Webb et al. (2016) and Martin-Borras et al. (2018) were screened using the IPAQ prior to their involvement and excluded if they were already active at the recommended 150 mins MVPA per week threshold

at baseline. AWL participants were not screened prior to their involvement in the scheme resulting in many participants being already sufficiently active prior to their involvement in AWL. This is not novel within ERS research (e.g., Murphy et al., 2012; McGeechan et al., 2018), however, whilst these participants were similarly excluded prior to analysis by McGeechan et al. (2018), they were included here and by Murphy et al. (2012) in order to maintain ecological validity and provide a pragmatic evaluation of how schemes may operate in a real-world context. Secondly, the ERS reported by Webb et al. (2016) and Martin-Borras et al. (2018) were more rigidly structured in respect of the type and mode of PA offered to participants, compared to the relative flexibility of AWL provision. For example, Martin-Borras et al. (2018) was conducted in primary care where participants were required to attend twice-weekly exercise sessions over a 12-week period. In contrast, AWL participants were largely able to access community-based exercise facilities as frequently as they liked, which may have led to a greater volume of PA being performed. Notwithstanding, as it was not possible to assess AWL attendance data, it is not possible to accurately determine whether this increased opportunity was linked to actual increases in PA. Thirdly, the demographic characteristics of the samples may have contributed to the lower levels of MET-min-week^{-1} reported. For example, Webb et al. (2016) recruited a small sample (n = 68) of participants with CVD, whilst the sample in Martin-Borras et al. (2018) were considerably older (M = 69.5 years for the intervention group, M = 68.2 years for control) than AWL participants. AWL participants also reported a reduction of 120 mins/week in sitting time. This is a greater reduction than reported by Gallegos-Carillo et al. (2017) who observed no change, and greater than the review by Rowley et al. (2019b) who identified a reduction of 60 mins/week. The greater reduction in sitting time here may be expected due to the relative greater increase in weekly PA.

Sub-population analyses revealed significant increases in total MET-min-week^{-1} for AWL participants in each primary reason for referral category. Referral conditions varied considerably in respect of baseline PA (471 MET-min-week^{-1} for obesity *vs.* 1671 MET-min-week^{-1} for CVD), and the size of PA increase (969.5 MET-min-week^{-1} for cancer *vs.* 3533 MET-min-week^{-1} for obesity). Only those in the obesity category were failing to achieve recommended WHO guidance of 600-1200 (WHO, 2012) MET-min-week^{-1} at baseline and all categories well exceeded guidelines at 12-weeks. Kyu and colleagues (2016) demonstrated that most major health gains are achieved by performing 3000-4000 MET-min-week^{-1}, where those performing 600 MET-min-week^{-1} had a 2% reduced risk of diabetes compared to inactive individuals. In contrast, an increase from 600 – 3600 MET-min-week^{-1} represented a 19% risk reduction. Apart from those referred due to cancer or diabetes, AWL participants in each primary referral category were achieving PA at levels above the 3000 MET-min-week^{-1} threshold at week 12. Additionally, previous research has suggested those with coronary heart disease are more likely to achieve PA increases via ERS participation (Campbell et al., 2015). Coronary heart disease is closely related, albeit not totally synonymous, with CVD. Murphy et al. (2012) found those referred due to coronary heart disease achieved significantly higher post-scheme PA than those referred due to mental health. Within AWL, whilst those in the CVD category reported higher PA than those referred for mental health at baseline and 12-weeks, those in the mental health category reported a greater relative PA increase at week 12. Accordingly, these findings demonstrate ERS completion can facilitate increased PA among participants across a wide range of health conditions.

PA levels were also calculated in terms of mins/week MVPA to facilitate comparison with prior ERS evaluations. AWL participants achieved an increase of 290 mins/week MVPA, representing a sizeable increase relative to the 29 mins/week MVPA (Hanson et al., 2013), and

27 mins/week MVPA (Dugdill et al., 2005) identified using Godin's Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1985). More recently, Duda and colleagues (2014), and McGeechan et al. (2018) reported increases of 196 mins/week MVPA (110 mins/week minus walking) and 180 mins/week MVPA, respectively, using the 7-day PA recall (Richardson et al., 2001). However, attempts to contrast PA change in AWL participants with previous findings are limited due to the use of different PA measures among researchers. As identified by Campbell et al. (2015), considerable heterogeneity exists in relation to the content of the PA intervention component within individual ERSs. Such heterogeneity is likely to remain due to the lack of guidance on preferred modes and types of PA which should be delivered during ERS (Rowley et al., 2019). Subsequently, it is possible that the particular PA strategies employed within AWL were more effective than those of previous ERS (e.g., Hanson et al., 2013). Alternatively, the discrepant findings may be due to differences in the way PA was quantified by the preferred PA measures of each study. In contrast to IPAQ-E and the 7-day PA recall, which include domestic and occupational forms of PA, GLTEQ only collects data pertaining to leisure time PA, which may have resulted in the lower overall PA volume reported by Dugdill et al. (2005) and Hanson et al. (2013). Notwithstanding, it can be inferred that the majority of PA change associated with ERS completion would occur as a result of increased leisure-time activity. The use of a self-report measure to assess PA change is a shared limitation among the current study and previous ERS evaluations (Steene-Johannessen et al., 2016). Self-report measures provide perceived estimates of PA that are subject to social desirability bias (Strath et al., 2013) and measurement errors (Steene-Johannessen et al., 2016) which commonly result in over-reporting (Lee et al., 2011; Cerin et al., 2016; Chastin et al., 2018). Recent work by Gallegos-Carrillo et al. (2017) and Hawkins et al. (2019) explored the feasibility of incorporating accelerometery-based PA measurement within ERS (Gallegos-Carrillo et al., 2017; Hawkins et al., 2019). Using accelerometery-based measurement,

Gallegos-Carrillo et al. (2017) reported an overall 40 mins/week MVPA increase among participants of a primary care-based ERS in Mexico, but a 104 mins/week MVPA increase for those who attended >50% of sessions. Participants in Gallegos-Carrillo et al. (2017) self-reported comparable baseline PA levels relative to that observed via accelerometery-based measurement, though self-reported much higher post-ERS PA levels. In this regard, it is possible that AWL completers overestimated their post-scheme PA, resulting in the notably high PA increase. Thus, incorporation of accelerometery-based PA measurement may enhance understanding of the impact of AWL completion on participant PA behaviour. However, Hawkins and colleagues (2019) identified cost and poor acceptability among ERS participants and providers as prominent practical barriers to the implementation of accelerometery-based PA measurement within UK-based ERS. Ultimately, further investigation is required to better understand the reasons contributing to the sizeable discrepancy that exists among ERS evaluations.

Of the 14 ERS currently included in the NRD (Steele et al., 2019), 3 reported SWEMWBS data. Baseline SWEMWBS scores were higher for AWL participants (26), compared to those reported by Steele et al. (2019) (24). Sub-group analyses showed considerable variation in SWEMWBS scores at week 1 according to primary reason for referral. With the exception of those referred due to cancer, a significant increase in well-being occurred across all sub-populations. Those referred due to mental health reported the lowest baseline SWEMWBS scores at baseline (21), whilst those referred due to respiratory health conditions reported the highest (29). Consistent with Pavey et al. (2011) and Murphy et al. (2012), AWL completion was positively associated with improved well-being among those referred due to mental health. Further, in contrast to Pavey et al. (2011) and Murphy et al. (2012), similar significant increases in well-being occurred in AWL participants with other

health conditions including CVD and diabetes. Interestingly, whilst those in the mental health referral category reported the greatest post-AWL SWEMWBS increase (7), this was still only equal or less than baseline scores reported in 3 of the remaining 7 primary referral categories. Accordingly, the notable improvement in SWEMWBS scores among those referred due to mental health in AWL may have remained concealed if only complete sample analyses were performed. Thus, these findings re-emphasise the saliency of conducting sub-population analyses to investigate the impact of ERS completion on key health and well-being outcomes.

This study has several limitations which should be considered. Firstly, the duration in which participants were enrolled to AWL varied from 7 – 70 weeks. It cannot be definitively inferred from the available data why AWL duration varied so substantially. However, in response to the AWL client base comprising elderly adults and those with severe health conditions, providers had the discretionary power to put participant scheme membership on hold for a variety of reasons, including illness and/or injury. These participants are likely to be excluded from tightly controlled RCT's (e.g., Webb et al., 2016), though it remains unclear how data from these participants were handled within previous naturalistic ERS observations (e.g., Hanson et al., 2013; Kelly et al., 2017; McGeechan et al., 2018). This is an important consideration as it is not clear whether disruption to ERS participation may impede the capacity to achieve desirable physical, behavioural and wellbeing outcomes. Recent evidence indicates longer-length ERSs of 20+ weeks are more effective for improving health and well-being (Rowley et al., 2019). Adoption of longer-term ERSs may enable sufficient time for participants to return to schemes and re-build PA tolerance and volume after unavoidable short-term absences.

The inability to assess the adherence behaviour of AWL participants is a further limitation of the current study. Recognising ERS adherence as the number of sessions attended, there is a positive association between number of sessions and positive ERS outcomes (Murphy et al., 2012). However, to date, only Hanson et al. (2013) has provided comprehensive ERS attendance data. Completers in Hanson et al. (2013) attended approximately once a week throughout their enrolment, though this was subject to variation across different sites. Contextually, it is possible that the greater PA increase reported by AWL participants relative to Hanson et al. (2013) reflects a greater number of attended weekly PA sessions, however, this can only be speculated given absence of the relevant AWL data. Notwithstanding, the underlying assumption that greater attendance of ERS sessions equates to better health-related outcomes is contentious (Tobi et al., 2012). This is because it fails to take into consideration that similar health related benefits can be achieved via the performance of PA of varying duration and intensity within different sub-populations, such as the sedentary, obese, or elderly (Wafsy & Baggish, 2016).

A further limitation pertains to the potential nested nature of data. Nested data can occur when data samples comprise participants belonging to distinct sub-categories (Galbraith, Daniel & Vissel, 2010). Specifically, the analyses presented here violated the assumption of independence by failing to account for potential differences linked to the specific leisure centre location attended by AWL participants. Accordingly, the analyses did not account for the likelihood that AWL participants who attended specific leisure site locations shared common characteristics, experiences and environmental influences which made them more similar to each other as opposed to being truly reflective of the whole sample (Galbraith et al., 2010). Alternatively, this study may have employed hierarchical multi-level modelling to explore the role of individual AWL leisure site location on physical, behavioural and well-being outcomes.

Ultimately, this approach was not taken due to (1) the relatively small sample size when data were stratified by AWL leisure site location, and (2) the non-normal distribution of data which guided the analysis approach. Moving forwards, future multi-site ERS evaluations should consider the potential nested nature of data to improve understanding of factors linked to positive ERS health outcomes.

Conclusion

The primary aim of this study was to explore physical, behavioural and well-being outcomes associated with AWL completion. Positively, AWL completion facilitated significant reductions in BMI, SBP and sitting time, as well as increased PA volume and well-being. The secondary aim sought to investigate the extent to which AWL outcomes vary according to participant weight status and reason for referral. Participants classified as obese reported the greatest BMI reduction compared to those classed as overweight or normal weight. Physical, behavioural, and well-being outcomes varied in relation to participant's primary reason for referral. For instance, those referred due to a mental health condition reported a significant reduction in sitting time and a significant increase in PA and well-being, though failed to report significant reduction of DBP or SBP. In contrast, those referred due to cancer significantly reduced their BMI, though no significant differences were observed in relation to sitting time, PA, well-being, DBP or SBP. Thus, this study presents evidence of variable ERS effectiveness among participants with different health conditions. Future research should progress beyond analyses of complete ERS samples to further explore outcomes within distinct ERS sub-populations. Continued engagement in such evaluation practice will facilitate greater understanding of who may benefit from ERSs and how. Currently, the use of different data collection and analysis methodologies impede accurate between-ERS comparisons. Thus, the extent to which ERS completion facilitates increased PA remains unclear due to the use of different measures between studies and over-reliance on self-report measures. Finally, criticisms of ERS for being unable to facilitate 'meaningful' health related improvements are imprecise. Definition of what constitutes a 'meaningful' health improvement would undoubtedly benefit ERS policy makers and organisers and provide the opportunity to inform future practice.

Thesis study map

Study	Objectives and Key Findings
Study One – Uptake and completion rates of AWL: Evidence from a self-referral friendly ERS	**Objectives** - Explore rates of AWL uptake and completion. - Explore demographic and referral characteristics of those who accessed AWL.
	Key Findings - Rates of AWL uptake and completion were consistent with previous ERSs despite the considerably greater prevalence of self-referrals. - Demographic patterning of AWL participation was comparable with previous ERSs.
Study Two – Physical, behavioural and well-being outcomes associated with AWL completion	**Objectives** - Investigate physical, behavioural and well-being outcomes associated with AWL completion. - Explore potential differences in physical, behavioural and well-being outcomes according to primary referral condition.
	Key Findings - AWL completion was associated with a variety of physical, behavioural and well-being-related improvements. - Participants varied considerably in terms of the magnitude of BMI reduction, blood pressure reduction and physical activity increase according to primary referral condition
Study Three – Facilitators and barriers to AWL completion: A needs analysis	**Objectives** - Explore perceived facilitators and barriers to AWL completion - Investigate factors that influence perceptions of facilitators and barriers
Study Four – Optimizing peer support in AWL: AWL client and stakeholder perspectives on peer recruitment and implementation	

Study Five - Acceptability of the AWL peer intervention: Evidence of promise and lessons for the future

Chapter 6: Facilitators and Barriers to AWL Completion

Introduction

Age is associated with ERS completion (McGeechan et al., 2018), with those aged 55+ years more likely to complete ERSs (Hanson et al., 2013; Kelly et al., 2017). Indeed, as evidenced in chapter four, older adults, those from the least deprived areas, and males were more likely to complete AWL. However, a better understanding of the explanatory mechanisms underpinning *why* completion rates differ among ERS sub-groups is needed (Pavey et al., 2012). Qualitative research can yield in-depth contextual understanding to supplement and enrich quantitative findings (Cresswell et al., 2014). Qualitative approaches inherently recognise the complexity of human behaviour, seeking to explore and explain the occurrence of beliefs and behaviours within specific contexts (Draper, 2004). Thus, qualitative exploration of perceived facilitators and barriers to ERS completion can further understanding of why dropout may occur (Pavey et al., 2012), enabling future ERSs to be modified to mitigate dropout risk (Moore et al., 2013).

Qualitative research has identified practical, social and environmental facilitators of ERS completion (Morgan et al., 2016). The opportunity to attend structured exercise sessions under the supervision of qualified exercise referral professionals is consistently identified as a primary facilitator (Murphy et al., 2012; Moore et al., 2013). The provision of supervised sessions enhances participants' perceptions of safety, enabling them to gain valuable knowledge of exercise equipment and training principles within controlled settings (Wormald & Ingle, 2004). This combination of factors enhances PA self-efficacy and promotes ongoing adherence (Mills et al., 2012; Vinson & Parker, 2012). Similarly, goal setting and progress monitoring via exercise referral officers (EROs) is positively associated with adherence (Moore et al., 2013), particularly when accompanied by perceived improvements in health-related fitness (Eynon et al., 2018). Moreover, social support is frequently referenced as a

mechanism that promotes ERS completion (Moore et al., 2011; Sharma et al., 2012; Hanson et al., 2019). The receipt of social support can ease assimilation into new or unfamiliar ERS environments (Morgan et al., 2016), and instil belief that health-related improvements can be achieved (Moore et al., 2013). Social support fosters feelings of enjoyment (Schmidt et al., 2008), and accountability (Vinson & Parker, 2012), which are positively associated with ERS completion (Morgan et al., 2016).

The relationship between ERS facilitators and barriers is symbiotic (Hanson et al., 2019). Perceptions of an unsupportive ERO (Morgan et al., 2016), or inability to access social support (Moore et al., 2013), are barriers to ERS completion. Similarly, preconceptions of an intimidating ERS environment is a common barrier (Wormald & Ingle, 2004; Morgan et al., 2016). ERS environments are anticipated to be populated by fit, muscle-bound individuals (Morgan et al., 2016), which invokes anxiety among prospective ERS participants. Additionally, time-related constraints, such as work or family commitments, can prevent access to supervised sessions (Murphy et al., 2012; Mills et al., 2012), particularly among younger ERS participants (Moore et al., 2013). Consideration of facilitators and barriers to ERS completion may explain why older individuals are more likely to complete ERSs (James et al., 2008; Tobi et al., 2012). Notwithstanding, there is insufficient evidence to support a positive association between greater understanding of facilitators and barriers to ERS completion and actual completion rates. Specifically, the AWL evaluation findings (chapter 4) indicate no change in the long-established socio-demographic patterns associated with ERS completion.

Undoubtedly, a multitude of factors may contribute to the unchanged rates and sociodemographic patterns of ERS completion (Hanson et al., 2020). As such, these findings may indicate an inability among ERS providers to successfully incorporate the

recommendations of academic research into applied practice. Alternatively, however, existing guidance on facilitators and barriers to ERS completion may fail to appropriately recognise the impact of ERS participant heterogeneity (Henderson et al., 2018; Hanson et al., 2019). Facilitators and barriers to ERS completion may vary as a function of key demographic factors, such as age (Moore et al., 2011) and primary reason for referral (Mills et al., 2012; Hanson et al., 2019). Similarly, personal characteristics, such as whether referral was sought or advised by a primary health care provider, may reflect differences in the perception of facilitators and barriers to ERS completion (Moore et al., 2011). Improper recognition of factors to influence perceptions of facilitators and barriers precludes the ability for ERS research to provide adequate guidance for how to promote better ERS completion, particularly among sub-populations with the highest dropout risk. Further, whilst the importance of social support has been consistently emphasised as a key facilitator of ERS completion (e.g., Vinson & Parker, 2012; Morgan et al., 2016), there remains a lack of guidance on how ERSs can provide sufficient opportunities for social support. This is essential given dissatisfaction with social opportunities is associated with negative ERS experiences (Stathi et al., 2004) and increased dropout risk (Hanson et al., 2019).

The primary aims of this research were (1) to explore perceived facilitators and barriers to AWL completion, (2) to investigate factors that influenced perceptions of what constituted a facilitator or a barrier, and (3) to elicit insight on the social support experiences and expectations of AWL participants. Investigation of these aims and use of participant feedback would subsequently inform the development of a bespoke intervention to enhance AWL completion rates.

Methods

Participants

A purposive sampling strategy was used to recruit 22 participants (12 females) who had recently completed AWL at one of the four leisure sites (Bryman, 2016). AWL completers were strategically targeted as they were deemed able to provide thick descriptions of facilitators and barriers to AWL completion. Participant ages ranged from 30 to 77 years (59.77 ± 11.62 years), and all identified as White British. Participants provided demographic information pertaining to their height, weight and weekly PA volume (mins per week) during an initial assessment appointment conducted by a trained ERO upon scheme entry (Week 1). At week 1, participants' weight status and PA volume varied considerably, with BMI ranging from 23.8 – 43.1 kg/m^2 and PA volume ranging from 0 to 150 mins MVPA per week. Completer's post-scheme data are not provided here as the aggregation of such data is incompatible with the person-centred exploration of the current study. Further key demographic criteria are summarised below (Table 7). Participant eligibility was determined on the basis of whether (1) they had attended a 12-week follow-up assessment appointment upon AWL completion and (2) had done so within one month prior to the interview. In addition, a conscious effort was made to recruit a relatively even sex split to facilitate potential exploration of sex-specific facilitators and barriers to AWL completion. The researcher was unaware of participant's primary reason for referral prior to interview. Pseudonyms were generated to preserve participant's anonymity.

Table 7. Participant pseudonym's and key demographic characteristics.

Pseudonym	Age (years)	Sex	Primary reason for referral	Leisure site
Elaine	70	F	Respiratory	Skelmersdale
Mary*	54	F	CVD	Burscough
Donna*	70	F	CVD	Burscough
Sandra	51	F	Mental Health	Burscough
Felicity	41	F	Cancer	Skelmersdale
Glenys	55	F	Mental Health	Burscough
Joanne±	62	F	CVD	Skelmersdale
Margaret	61	F	Musculoskeletal	Burscough
Genevieve	65	F	CVD	Skelmersdale
Sarah	59	F	Obesity	Burscough
Elizabeth°	70	F	Respiratory	Burscough
Christine	69	F	Mental Health	Banks
Trevor	45	M	Mental Health	Burscough
Owen	30	M	Mental Health	Ormskirk
David	47	M	Mental Health	Skelmersdale
Ken±	61	M	Musculoskeletal	Skelmersdale
Michael	77	M	Respiratory	Ormskirk
Philip	70	M	Musculoskeletal	Ormskirk
Martin	59	M	CVD	Skelmersdale
Gregory	58	M	Respiratory	Skelmersdale
Alan	68	M	Musculoskeletal	Ormskirk
Graham°	73	M	CVD	Burscough

*friends interviewed together, ±married couple 1, °married couple 2.

Data collection

Data were collected via semi-structured interviews conducted between May and July 2018. Interview length ranged from 10 to 35 minutes duration (Mean duration = 23 minutes), with all interviews digitally recorded and transcribed verbatim. Participants were fully debriefed following interview completion and given the opportunity to ask any further questions regarding their involvement. An interview guide (see appendix C) was developed and used to ensure consistent coverage of similar topics across all interviews. This guide comprised questions designed to capture data on facilitators and barriers to AWL completion, as well as social interactions experienced or observed during AWL.

Data analysis

An inductive thematic analysis was performed on the data in accordance with guidance set out by Braun and Clarke (2013) (see chapter 4 for full discussion of methods).

Results

The following themes highlight perceived facilitators and barriers to AWL completion. Facilitators and barriers are grouped around salient characteristics that were identified as influencing participant perceptions and attitudes towards AWL. The first theme highlights the importance of structure and routine. Many participants discussed adhering to a rigid structure for accessing AWL, which was inherently linked to the extent of participants other commitments, such as, work or family-related responsibilities. The second theme centred around participants PA experiences prior to AWL. Participants with fewer PA experiences reported key barriers, such as, apprehension about entering the gym environment and relative dependency on EROs, that were not reported by more experienced exercisers. The third, fourth and fifth themes explored perceptions of the social environment of AWL, willingness to socialise, and how social bonds developed throughout AWL, respectively. Participants reported different social needs and expectations of AWL, which may have manifested in their reports of social interaction with others and the development of social bonds.

Structure and Routine (Other commitments)

Participants spoke of adhering to a consistent routine throughout AWL. The most prevalent pattern of attendance was for participants to attend AWL at set times and on set days throughout the week. As explained by Martin: “I just plan my week out, so on Mondays, Wednesdays, Fridays, one o'clock is the gym, no matter what”. This pattern of Monday, Wednesday and Friday was adopted by many, however, there were key differences related to why participants adopted routines. Those without other commitments, like Owen, were finding AWL provided some structure and purpose to their week: “I'm not working at the moment, so I'm finding that it's filling the day out for me”. Similarly, as Joanne and her husband had recently retired, they perceived AWL as a productive distraction from other activities: “Do we

sit watching bloody daytime TV, or do we get out and about and do something?". No definitive explanations were offered for why many participants chose Monday, Wednesday and Friday as their exercise days, however, by doing so, they were able to get used to seeing the same faces within the gym: "You do tend to see a lot of the same people. Creatures of habit you see aren't we (laughs)" (Margaret). These social opportunities appeared to reinforce adherence for participants like Christine: "Well…you think 'ooh, such and such is here this week', or they'll say to you 'oh, see you next week' and…erm…you feel as though you've got to go, it's like an incentive, it motivates you to come along".

In contrast, those with other commitments, like Trevor, had to adopt a strict routine in order to incorporate AWL into his busy working lifestyle. Due to working commitments, Trevor was restricted to one evening session where he was able to interact with an ERO. However, this wasn't necessarily perceived negatively:

> It's hard to motivate yourself to come, and I think the good thing is, this does, because it's like [the ERO's] here every week, and I sort of set the goal of I have to come on the Wednesday. It makes me come, which is good.

Similarly, Mary discussed meeting up with a friend at set times to ensure that she stuck to a routine of regular attendance: "I like the fact that I come straight from work. If I went home, I'd never come, but I come straight from work, we meet in the car park, we have a routine". Notwithstanding, some participants had commitments that were extensive and unpredictable which negated their ability to consistently adhere to a structured routine. For example, Trevor also discussed how the arrival of a new baby presented even further restrictions for his opportunity to access AWL:

> I would have liked to have been able to come more, but that's not down to the gym or the availability. It's because we've had a baby during the twelve weeks, so I've been limited with the time I've got.

Similarly, whilst Sarah completed AWL and achieved some positive physical health outcomes, she also discussed not being able to attend as many sessions as she'd have liked and expressed dissatisfaction that she was not able to achieve more during AWL: "But with the job that I do, you're just snatching here and there for all sorts of different reasons, you know, for family, for work and going away with work, and all the rest of it, you know?". Accordingly, participants remarked on how adopting scheduling behaviour helped to maintain adherence throughout AWL. Personal circumstances and commitments varied considerably for AWL participants, but most spoke of adhering to a structured routine and expressed dissatisfaction when this wasn't possible.

Previous PA experience

Perceptions of facilitators and barriers were strongly influenced by the extent of participants previous PA experience. Some participants, like Christine, spoke of her history as a gym goer and regular exerciser:

> The gym is very much like the gym that I used to go to, it's only a small gym up in Hesketh Bank, and erm…I was used to doing all sorts of different classes, I used to do Zumba, body combat…erm…aerobics, I've done all those sorts of things over the years.

However, for many others, AWL was their first experience of a gym environment, which lead to feelings of trepidation. Primarily, anxieties centred around feeling out of place in a social exercise environment and the sense that others would be negatively evaluating

aspects of their appearance or physical capability. Mary was initially apprehensive about the prospect of standing out:

> I think there's a fear, and most people that really need to come, like us, yes, that you're going to get slapped with a badge that says you're a wobbly, falling to bits person, and you stand out like a sore thumb, and everybody else is fit and pumping iron.

Similarly, Martin was most concerned with not being as fit as others within the gym:

> [the ERO] had me walking for 15 minutes at the start. And that was my biggest fear was 'he's doing f****** half an hour', 'he's doing an hour running like a c***'. Do you know what I mean? And then I look a right p**** here, do you know what I mean?

Positively, once individuals had entered the gym their fears were assuaged via upwards and downwards social comparisons:

> I didn't expect to feel comfortable, like I say it's the first…the unknown, it's being overweight, it's being unfit it's the whole thing. And then when you come in and you look around, there are people better than me, there are people worse than me, so I just fitted in. (Margaret)

> I think what really benefitted me was coming in and seeing all the different shapes and sizes, at different stages within the programme, and not only... That was the full members as well, full-time members, as they call them. And it was, that in itself made you feel more relaxed, more comfortable, and you thought, "I'm not abnormal here, and I'm part of this family, as far as I'm concerned". (Ken)

In this regard, it was apparent that some AWL participants may have had to overcome different barriers to others. For example, lesser PA-experienced participants also described the

sensation of PA-related pain. PA-related pain was referenced as a particularly salient feature of their early AWL experiences by Ken: “And yes, initially, there was some pain, but you work through it, and I think the best piece of advice that was given to me was just listen to your body”, and Martin: “I’ll be honest with you, I mean first couple of weeks I was thinking ‘‘what am I doing here’’, like, do you know what I mean? Because it was hard”.

Better understanding and experience of what level of pain may be expected to be ‘normal’ following PA may be beneficial for more experienced exercisers as it can help to lessen anxieties and enable continued adherence. This may be especially important among a clientele such as AWL where serious health concerns are prevalent. It is important to understand factors influencing perceptions of barriers and facilitators as they can impact the type of support and guidance that is offered to different AWL users. For example, Joanne spoke of the value of an ERO in providing support and confidence:

> Mine wasn't so much about using the gym, it was about the people, then I'd feel inferior and even worse than I did, but I didn't get that, I came and I felt motivated more or less straight away basically, because [exercise referral officer] had said, "You can do it".

In contrast, those with a more extensive history of PA expressed greater confidence in accessing facilities on their own. For example, Elizabeth explained how her, and her husband’s previous PA experiences made them less reliant on EROs, enabling them to be promoted to Tier Two access relatively early:

> We’d always been to the gym, and been going to the gym, so we, sort of, knew, you know, what we were doing and we knew our limits and what have you, so we’d only came a few weeks and [ERO] said, ‘well, if you want to come on your own…’.

Felicity had a similar history of being physically active independently. For her, the value of the ERO was more to maintain her motivation and adherence to the scheme: “Because I’m sort of on a timescale really so I’ve just like come and do it, go, erm but [the ERO] has kept me motivated and I don’t think, some weeks I might not have come”.

Social experiences

As evidenced within the preceding themes, AWL participation was inherently linked to social behaviour. Social interaction was one component of the multifaceted reasons why participants adhered at certain times, and how they remained motivated. Indeed, anxiety relating to joining AWL was due to an unknown, threatening social environment, whilst this anxiety was alleviated following positive social comparisons. The following theme presents participant discourse pertaining to the social processes operating within AWL.

A key feature of AWL was that all sessions took place within the main gym to which non-AWL gym users had unrestricted access. Hence, this practice facilitated a sense of anonymity in that it was not always apparent whether fellow exercisers were also members of AWL. Some participants, like David, were unable to distinguish who was on the scheme and who wasn’t, whilst also suggesting identifying a distinction was unnecessary:

> I can't differentiate, and I've never asked, and I've never been asked. So, we're all as one, really. We take each other as we see. I'm sure a few of them are on the twelve-week scheme, and I'm sure some are on different schemes, if there are any, but I don't ask them.

Others carried a presumption that older and less physically capable exercisers would likely belong to AWL. For example, when asked whether it is possible to identify exercisers

that may be on AWL, Elizabeth responded: “Well…(laughs)…probably…erm…some of them, yeah. The walking sticks give it away…(laughs)”. Gregory shared this preconception: “I’d say all of the older people are here because of the scheme and they look as though they are enjoying it now and they look as if they are here for the foreseeable, like me”. Importantly, whereas Gregory appeared to associate closely with the older gym users, younger AWL participants, like Felicity, were less enthusiastic about accessing the gym alongside older users during supervised sessions: “And those first few sessions that I went to, the gym was just full of old-aged pensioners and I was like ‘oh my god’ (laughs), and I know that I’m not young…but I certainly felt a bit out-of-sorts”. Felicity highlighted how AWL participants often carried around bespoke programme cards designed by EROs, describing her unwillingness to do so as being linked to not wanting to be identifiable as an AWL user:

> I’m sort of like in between, because like when I started I seen all the people on the scheme and they were like more immobile than me, so I didn’t consider myself to be like one of them if you know what I mean, without it sounding snotty. But then yeah, I just wanted to kind of blend in a bit more and not…one thing I didn’t like was the sheets because everybody then knew that I was on the scheme.

With several exceptions, particularly amongst some, but not all, of the younger participants, many expressed a sentiment of commonality within the gym that encompassed differences in sex, age and physical condition. As explained by Martin, “You find yourself…everyone’s in the same boat. They’re all here, and they’re all trying to make themselves better…or in some way improve themselves”. Owen shared this sentiment: “You've got something in common with everyone really, haven't you, because you're always going towards the same aim, so you can quite easily get a conversation up, which when you're suffering with depression, isn't the easiest thing to do”.

Willingness to socialise

Participants exhibited considerable discrepancy in their willingness to engage in social interaction throughout AWL. Elaine explained how she wasn't particularly interested in socialising during AWL and sought to exercise at times when the gym was quiet:

> I enjoy it mostly when there's not many people here, because I'm not a people person. I hate it when it's packed, but when I come in and there's just a few, I really look forward to it. I'm very self-conscious, so I don't like people looking at me doing [exercise].

Similarly, Trevor discussed how his social interaction during AWL had been minimal, though this was not expressed as a limitation or contrary to what he signed up for:

> I've not really talked to anybody else, no, because when I come, I'm doing my exercise. So, you're aware that there are people, but it's not like there's any sort of, and I don't expect there to be, there's no encouragement to chat with other people, but as I say, I didn't come with that expectation at all. It wasn't sold to me as that.

Other participants liked the ability to come into the gym and exchange simple pleasantries with their fellow exercisers. In these cases, conversations occurred on a regular basis and remained largely superficial. For instance, these interactions were unlikely to involve swapping of personal information, such as names. Responses were similar among younger participants, like Owen: "I've become friendly with a few people, but it's just like passing comments and friendly conversation. I don't know what his name is, but there's some lad that was doing something wrong on the machines, and I told him". As well as older participants,

like David: “There was a few of the guys. I don't tend to know their names, but we know to let onto eachother, and we know, "Hi", and pleasantries, we support us and we seem to connect together”, and Genevieve: “There are 2 or 3 but I don’t know their names, we’ve never got to sort of name changing. So, I couldn’t identify anybody by name. You just sort of make comments about what you’re doing”.

In rarer cases, participants spoke of developing valued social bonds via AWL or described interactions with fellow scheme users which expanded beyond the gym environment. For example, Sarah discussed having coffee meetings with a little network of friends who had met via AWL:

> It’s developed now so it’s not all to do with the group, you know, like I say we’ll go and have a coffee and that and just chat about our lives in general now so it’s developed into a... what started off as all of us being unsure doing something we’ve not done before, it’s become a bit of a like social thing now.

Developing social bonds

Participants were asked to consider how social interaction occurred for them within AWL. Participants frequently referenced the notion of ‘icebreakers’: instances where they remember sparking up conversations with fellow AWL users. Primarily, this revolved around interacting with those closest whilst exercising, or seeking advice on how to operate gym equipment. Sandra expressed relative ease with striking up a conversation: “Literally, you are on the treadmill and there’s a damn big mirror in front of you and you suddenly realised you’ve made contact and ‘hiya’ you know, and then coming in it’s literally one of those”. Philip

appeared similarly socially adept and discussed his use of humour in engaging fellow exercisers:

> If someone's sitting on the next bike, I'll just say 'alright', I'll just say something like 'I'm in Paris at the moment, I'm just popping up to the Champs-Elysees where have you got to, you know I'll just pull the leg. I like to have a bit of humour and, break the ice.

David described a different tactic of asking questions related to the use of gym equipment: "If someone seemed to be friendly enough next to me there, "Excuse me, how do you work this, or how do you find this machine better than that one?" And then, if they come back with kind of a nice response, then I'll know that they're ok". As alluded to in the theme of structure and routine, participants were often used to seeing familiar faces at similar times. In some instances, the combination of icebreakers and routine over time led to the development of a friendly community atmosphere, as described by Michael: "We're all sat there today, I guarantee someone will come and speak, and then someone else, and someone else and someone else. And everybody stood on those machines there, I know all those".

Discussion

Participants discussed key facilitators and barriers to AWL completion. Apparent overlap existed between identified facilitators and barriers to AWL completion and those highlighted by previous ERS research (Morgan et al., 2016). AWL participants emphasised the benefits of adhering to an exercise routine, the importance of receiving perceived social support from others, and initial anxieties surrounding the prospect of entering the exercise environment. Notwithstanding, this study identified the salient factors of other commitments, and previous PA experiences, which influenced perceptions of facilitators and barriers. Participants with greater previous PA experiences were less likely to identify the exercise environment or PA-related pain as barriers to AWL completion. Additionally, participants provided insight on the social processes operating within AWL.

The first theme centred around the salience of structure and routine to AWL completion. Almost all participants adhered to some form of structure when accessing AWL, however, routines were significantly influenced by the extent of participants other commitments. Supervised ERS sessions are predominantly offered during usual business hours (Morgan et al., 2016), restricting access among those with extensive work and family-related commitments (Wormald & Ingle, 2004; Morgan et al., 2016). However, the provision of a weekly supervised evening session afforded AWL participants the opportunity to access ERO support. This restricted access to supervised sessions promoted adherence for some AWL participants by increasing accountability. In contrast, it is unclear why those with fewer other commitments adopted structured exercise routines during AWL. EROs may have encouraged participants to attend the scheme on Mondays, Wednesdays, and Fridays in order to enable habit formation, which is a positive predictor of adherence among new gym users (Gardner et. al., 2011). Structured exercise routines promote adherence by enhancing automaticity (Lally &

Gardner, 2013), and minimising perception of exercise-related barriers (Pfeffer & Strobach, 2018). Additionally, overlapping exercise routines created opportunities for social interaction and peer support, which reinforced adherence and promoted AWL completion. Irrespective of other commitments, participants discussed a link between AWL attendance and the ability to access social support via peers, friends, and/or EROs. These findings reinforce the importance of social support to ERS completion (Vinson & Parker, 2012; Moore et al., 2013). Other commitments that prohibit adherence to structured exercise routines may increase the likelihood of ERS dropout by disrupting habit formation and reducing social opportunities.

The second theme documented how participants' previous PA experiences influenced perceptions of facilitators and barriers. Preconceptions of an intimidating exercise environment area prevalent concerns among ERS participants (Vinson & Parker, 2012; Morgan et al., 2016), particularly women (Wormald & Ingle, 2004). There was no evidence of sex differences within AWL, though those with lesser PA experience were more likely to describe the exercise environment as intimidating. Similar to Morgan et al. (2016), concerns centred around preconceived ideas that others would be fitter, younger, and more attractive than themselves. Many discussed how these initial fears had been assuaged at an early stage due to upwards and downward social comparisons. In threatening social environments, downwards comparisons are protective strategies which bolster feelings of self-esteem and self-efficacy (Buunk & Mussweiler, 2001), which have been linked to ERS adherence (Eynon et al., 2018). Upwards comparisons promote ERS adherence by reinforcing belief that health-related improvements can be made after witnessing the perceived progress of others (Moore et al., 2013; Hanson et al., 2019). Vinson and Parker (2012) reported a similar transformation in participant attitudes towards ERS, however, our findings extend the literature by evidencing the influence of prior PA experience. This is an important elaboration as it enables the development of different ERS

support strategies according to participants previous PA experiences. Inability to overcome an initial fear of the exercise environment is likely to contribute to ERS dropout (Hanson et al., 2019). Thus, ERS dropout risk may be mitigated by offering additional support to ease the transition of new exercisers into the gym.

Similarly, PA experience may be associated with PA self-efficacy, which is a positive predictor of ERS adherence (Eynon et al., 2017). Eynon and colleagues (2017) identified PA self-efficacy positively predicted ERS completion at 4-weeks, but not at baseline. Eynon et al. (2017) found baseline differences were not observed as participants were assumed to be physically inactive prior to ERS. However, evidence from AWL and others (Moore et al., 2013; Campbell et al., 2015) has demonstrated high variance of participant PA levels prior to ERS. Notwithstanding, whilst baseline self-efficacy may not have predicted ERS completion in Eynon et al. (2017), it may have influenced the perception and experience of facilitators and barriers. The barrier of PA-related pain was referenced most frequently among AWL participants with lesser previous PA experiences. This appeared to reflect perceptual differences in the experience of PA-related pain, such as, awareness of what degree of pain may be expected following PA and confidence that pain would ease over time. Further, those with greater PA experience were less dependent on EROs and were often quickly promoted to Tier Two gym access. The opportunity to attend supervised sessions is a primary facilitator for ERS completion due to the ability for participants to exercise in a controlled environment whilst receiving support and guidance from EROs (Wormald & Ingle, 2004; Mills et al., 2012; Moore et al., 2013). However, opportunity to access supervised sessions did not appear to serve as a primary facilitator for AWL completion among those with previous PA experiences. Correspondingly, previous PA experiences enabled lifting of gym-access related restrictions via promotion to Tier Two membership, removing the barrier of inconveniently scheduled

supervised session times for some. Prior to this study, perceptions of facilitators and barriers related to previous PA experience had yet to be qualitatively explored. However, the positive association between pre-ERS PA and completion (Campbell et al., 2015), as well as the increased likelihood of dropout within the first weeks of ERSs (Gidlow et al., 2005), may reflect a greater extent of barriers faced by those with lesser previous PA experiences.

Theme Three encapsulated the social expectations and experiences of AWL participants. Social expectations and needs varied, with some participants uninterested in engaging in social behaviour during AWL. These findings echo Moore and colleagues (2011) and reflect differing motivations among ERS participants. Recognition of differing social expectations and needs within ERSs is important to demonstrate how facilitators and barriers are shaped by participant perceptions. Stathi et al. (2004) found social experiences to be central to positive ERS experiences among older women, who also expressed dissatisfaction if social opportunities were deemed insufficient. In contrast, AWL participants, comprising men and women of differing ages, largely considered their various social needs and expectations to have been satisfied. This offers indirect support to claims that opportunities for social interaction may be more salient among certain ERS sub-populations (James et al., 2008; Campbell et al., 2015). Not all older women were interested in social interaction during AWL, indicating the presence of other factors to determine willingness to socialise among ERS participants that may be unrelated to age or sex. Hanson and colleagues (2019) reported ERS dropout risk may be higher when participants are unable to access desired levels of social support. As this study was solely comprised of AWL completers it is not possible to estimate the extent to which perceived insufficient social opportunities may have contributed to AWL dropout.

Regardless of whether they were directly involved in social interaction, participants spoke of a feeling of being "in the same boat" as their fellow exercisers, with these feelings primarily stemming from perceptions of similarity. This is a frequent finding among ERS research (Edmunds et al., 2007; Rahman et al., 2011; Littlecott et al., 2014), linked to the ability to access empathetic understanding from similar others (Moore et al., 2013). Dunlop and Beauchamp (2011) demonstrated how initial perceptions of similarity are based on age and sex, with high perceived similarity associated with better adherence of structured exercise programmes (Dunlop & Beauchamp, 2011; Beauchamp et al., 2018). Moore et al. (2013) postulated that ERS completion rates are lower among younger participants due to difficulty assimilating within a social environment predominantly populated by older women. Notwithstanding, AWL participants reported perceptions of similarity that appeared to transcend differences in age, sex, and primary reasons for referral. Critically, whilst Moore et al. (2013) involved small group-based sessions exclusive to ERS participants, AWL consisted of non-group-based provision which occurred within publicly accessible facilities. Thus, it is unclear whether perceptions of similarity were positively influenced by the presence of non-AWL gym users. It is possible that younger male AWL participants perceptions of similarity were heightened due to the presence of other younger males, despite these users not being part of AWL itself. Interestingly, many participants spoke of being unable to determine whether other exercisers were similarly involved with AWL, rendering shared AWL participation to be a nonessential component of perceived similarity. AWL's practice to operate within publicly accessible gym facilities may have enabled participants to engage with a wider, more demographically diverse social network, increasing opportunities for upwards and downwards social comparison. Moore et al. (2013) reported that participants were fearful about transitioning from small, exclusively ERS-patient group sessions to the wider gym environment upon scheme completion. The format of AWL mitigated the development of

similar trepidation by immersing participants within a wider community gym environment from an early stage. Further, this practice appeared to facilitate AWL completion for younger participants who were initially dismayed at the prospect of being characterised as an AWL member due to negative connotations relating to age and physical mobility. However, it remains unclear to what extent this practice may have also contributed to AWL dropout, particularly among those with heightened initial fears over preconceptions of an intimidating gym environment.

Social interaction primarily occurred in the form of short, trivial conversations among AWL participants. It is possible that perceived differences in age, sex, and/or primary reasons for referral inhibited the development of deeper social bonds, with described friendship groups typically characterised by demographic similarity. Alternatively, the development of deeper social bonds did not appear necessary to positively influence AWL adherence. Participants described how perceptions of similarity were fundamentally based on a shared goal of achieving health-related improvements. Perceptions of similarity are critical to the adoption of a shared sense of social identity (Tajfel & Turner, 1979; Turner, 1982; Turner et al., 1987). There is a growing evidence base to support a positive association between group social identity and exercise programme adherence (Strachan et al., 2012; Stevens et al., 2018), however, the impact of social identity within ERSs is yet to be explored. Notwithstanding, multiple authors have reported a positive association between relatedness and ERS adherence (Edmunds et al., 2006; 2007; Markland & Tobin, 2010; Rahman et al., 2011). Relatedness represents a feeling of belonging among ERS participants, which is analogous to the core ideology of a social identity approach. Better understanding of factors that influence perceptions of similarity will increase the opportunity to provide sufficient social support to ERS participants. Adoption of social identity principles within ERSs will enable participants

to access support from a wider social network, whilst remaining appropriately flexible and sensitive to differing personal preferences for social interaction.

Evidenced by the themes presented above, the identification of distinct facilitators and barriers to ERS completion is complex (Hanson et al., 2019). Mills et al. (2012) produced a conceptual framework to illustrate how ERS participants perceptions of success are influenced by a variety of interacting factors. Mills et al. (2012) framework describes how personal characteristics, scheme qualities, inclusion, exercise provider impact, and attendance feed into the central category of participant empowerment. The interaction of these factors is intrinsically linked to perceived improvements in physical and/or psychological outcomes, which feedback to inform prerequisite factors. There is significant overlap between Mills et al. (2012) and the reported facilitators and barriers to AWL completion. Accordingly, ERS dropout risk may be greater where perceived differences in the experience of facilitators and barriers impede the formation of self-efficacy and the achievement of positive health-related changes (Hanson et al., 2019). Our findings present further evidence for perceptions of facilitators and barriers to be significantly influenced by the demographic and personal characteristics of ERS participants. Moreover, findings highlight how differences in key factors, such as other commitments, can create widespread implications for participant ERS experiences. For instance, it may be assumed that AWL's provision of supervised session times outside of usual business hours counteracted the barrier of restricted ERS access (Morgan et al., 2016). However, this may be considered overly simplistic as attendance of evening supervised sessions resulted in participants being exposed to an inherently different socio-demographic exercise environment, which presented novel facilitators and/or barriers to AWL completion. Evening sessions had a higher prevalence of younger, fitter and more experienced community exercisers, which may have exacerbated initial apprehensions about the AWL

environment for some users. Further, evening supervised sessions were less likely to be attended by AWL participants, reducing opportunities for peer support. However, lower attendance of evening sessions may have facilitated greater levels of support from EROs, who had to distribute their time more stringently across many different AWL users during busier daytime sessions. Hanson and colleagues (2019) described how constant criteria are variably perceived as facilitators and/or barriers by ERS participants. The identification of key factors to influence perceptions of facilitator and barriers to AWL completion enables tailored forms of support to be offered.

It is important to discuss findings from AWL within the wider context of ERSs. The highlighted methodological differences between AWL and the ERS described by Moore et al. (2013), are considerable and reflect differences in the facilitators and barriers described by both studies. Moore et al. (2011; 2013) found adherence to be reinforced by participant's perceptions of role models within the small, ERS patient-only group sessions. AWL participants did not discuss the importance of role models, which may be a consequence of the non-group-based format and demographically diverse social environment. As participants described difficulty in distinguishing whether fellow exercisers may have been current or past AWL participants, opportunities for the identification of appropriate role models may have been scarce. Further methodological discrepancies hinder comparisons of findings across different ERS. As an example, Vinson and Parker (2012) recruited participants and providers from 5 different ERS spread across the north and south of the UK. The included ERSs in Vinson and Parker (2012) varied according to size (i.e., from 30 to 150 referrals per month), provision (i.e., one-to-one *vs.* one-to-one plus group-based sessions) and socioeconomic deprivation levels. The extent to which these factors may influence perceptions of facilitators and barriers to ERS completion is unclear, which may limit the transferability of Vinson and

Parker's (2012) findings. Perceptions of facilitators and barriers are also influenced by source of referral (Moore et al., 2011). Wormald and Ingle (2004) and Moore et al. (2011) identified a discrepancy between ERS participants who initiate their own referral and those for whom referral is advised. Those who seek referral were perceived as being more likely to adhere to the ERS (Moore et al., 2011). Thus, willingness to engage in ERS may represent a disproportionately salient facilitator of adherence, as participants who are more internally motivated to complete ERSs from an early stage may be less susceptible to the impact of some barriers. However, this study presents no direct evidence that source of referral influenced perceptions of facilitators and barriers to AWL completion.

The assumption of homogenous ERS facilitators and barriers across varying social demographic characteristics is problematic as it prevents the provision of tailored ERS support (Henderson et al., 2018; Hanson et al., 2019). Motivations to engage in ERS are diverse (Morgan et al., 2016), with perceptions of facilitators and barriers inherently skewed depending on what participants may wish to achieve via ERS participation. Moore et al. (2013) identified older participants were motivated by the maintenance of mobility and physical function, whereas younger participants focussed on maintenance or restoration of occupational function. Similarly, participants face novel barriers related to their primary reason for referral (Mills et al., 2012; Hanson et al., 2019), such as exacerbated PA-induced breathing difficulties among those with respiratory health conditions (Mills et al., 2012). Vinson and Parker (2012) found prior participation in a cardiac rehabilitation-based group exercise setting enhanced ERS preparedness among those referred for CVD. This may be reflected in AWL due to the enhanced likelihood that CVD referrals would complete the scheme, relative to other primary reasons for referral (see chapter 4). Moreover, the perceived severity of barriers may vary depending on personal participant characteristics. Moore et al. (2011) found those referred due

to mental health to report greater anxiety over the preconceived intimidating ERS environment. Notwithstanding, there was no evident link between primary reason for referral and the perception of facilitators and barriers among AWL participants. However, this may be due to participant eligibility being dependent on AWL completion. The sole focus on AWL completers is likely to have prohibited the identification of the most prominent barriers which contributed to dropout.

Conclusion

In conclusion, this study has presented participant accounts of facilitators and barriers to AWL completion. A key feature of previous qualitative research has been to assume generalizability across different ERS, which may be inappropriate given the inherent heterogeneity of ERS and those who access them (Henderson et al., 2018). A significant limitation of this approach is that identified facilitators and barriers are often presented in a broad, non-specific manner, which nullifies the opportunity for direct intervention. The identification of key factors to influence perceptions of facilitators and barriers, such as, other commitments, and previous PA experiences, may aid detection of participants who need extra support to overcome known barriers. Identification of specific facilitators and barriers to AWL completion enabled the development of a bespoke intervention to promote adherence. Additionally, this study explored the social processes that operated within AWL. The provision of social support has been repeatedly championed as a strategy to improve ERS adherence (Vinson & Parker, 2012; Moore et al., 2013; Morgan et al., 2016), however, this study provides the first in-depth investigation of who, why and how participants chose to engage in social behaviour within an ERS context. Accordingly, future interventions to enhance social support within ERSs will benefit from being flexible, inclusive and autonomy supportive, in order to satisfy the various social needs and requirements of participants.

Thesis study map

Study	Objectives and Key Findings
Study One – Uptake and completion rates of AWL: Evidence from a self-referral friendly ERS	**Objectives** - Explore rates of AWL uptake and completion. - Explore demographic and referral characteristics of those who accessed AWL.
	Key Findings - Rates of AWL uptake and completion were consistent with previous ERSs despite the considerably greater prevalence of self-referrals. - Demographic patterning of AWL participation was comparable with previous ERSs.
Study Two – Physical, behavioural and well-being outcomes associated with AWL completion	**Objectives** - Investigate physical, behavioural and well-being outcomes associated with AWL completion. - Explore potential differences in physical, behavioural and well-being outcomes according to primary referral condition.
	Key Findings - AWL completion was associated with a variety of physical, behavioural and well-being-related improvements. - Participants varied considerably in terms of the magnitude of BMI reduction, blood pressure reduction and physical activity increase according to primary referral condition.
Study Three – Facilitators and barriers to AWL completion: A needs analysis	**Objectives** - Explore perceived facilitators and barriers to AWL completion. - Investigate factors that influence perceptions of facilitators and barriers.
	Key Findings - Reported facilitators and barriers to AWL completion were consistent with previous ERS research. This included the perceived saliency of social support to ERS completion. - Expectations and experiences of social support differed among participants. - Perception of facilitators and barriers were significantly influenced by the extent of participants other (i.e., non-AWL) commitments and previous physical activity experience.
	Objectives

Study Four – Optimizing peer support in AWL: AWL client and stakeholder perspectives on peer recruitment and implementation	- Elicit AWL client and stakeholder perspectives to inform the development of a bespoke peer support intervention for AWL. - Explore perceptions of desirable demographic peer characteristics among AWL clients and stakeholders
Study Five - Acceptability of the AWL peer intervention: Evidence of promise and lessons for the future	

Chapter 7: Optimizing peer support in AWL: AWL client and stakeholder perspectives on peer recruitment and implementation

Introduction

Despite UK-wide proliferation of exercise referral schemes (ERSs: Pavey et al., 2011), there is equivocal evidence for their effectiveness to facilitate meaningful increases in PA (Rowley et al., 2019b), or improvements in short and long-term health (Wade et al., 2020). Such findings heighten concerns regarding the sustainability of ERSs (NICE, 2018), highlighting an urgent need to identify strategies to enhance their effectiveness. To advance the evidence base, Hanson et al. (2020) and Shore et al. (2019) advocate greater standardisation in the reporting of ERS evaluations. ERSs are vastly heterogenous in respect of the ages, sex, and health status of participants (Wade et al., 2020), and preferred duration and delivery methods among different providers (Henderson et al., 2018). Standardised reporting can facilitate more accurate comparisons of equivalent ERSs to investigate variable effectiveness of different ERS formats (Hanson et al., 2020). Consequently, this enables the identification and widespread promotion of consistently successful strategies associated with desirable ERS health-related outcomes. In this vein, social support is invariably identified as an integral component of successful ERS experiences (Rahmann et al., 2011; Vinson & Parker, 2012; Morgan et al., 2016), though there remains a lack of evidence to illustrate best practice for providing social support within ERSs. Thus, there is rationale for the development of a structured intervention to enhance perceptions of social support among ERS participants.

Recent work has investigated the viability of utilising peer support strategies to promote PA within health-related contexts (Hulteen, Waldhauser & Beauchamp, 2019), however, the use of a peer support approach for ERSs remains unexplored. Peer support is a distinctive form of social support, where the relationship between the provider and recipient of support is rooted in the recognition of perceived similarity and shared experience (Martin Ginis, Nigg & Smith, 2013). Peer-based PA interventions can be effective within a variety of environments (Hulteen

et al., 2019); including schools (Owen et al., 2018), community-based programmes (Beauchamp et al., 2018), and medical settings (Haidari, Moeini, & Khosrav, 2017). Though overall, the evidence base remains equivocal as to their effectiveness (Croteau, Suresh, & Farnham, 2014; Gorely et al., 2019). Matz-Costa et al. (2019) argue that peer-based PA interventions are largely ineffective due to the use of vague, inconsistent, and overlapping terminology associated with the term 'peer'. Such ambiguity obfuscates the exact way interventions are designed and implemented, creating replicability issues due to uncertainty over which components may have contributed towards an intervention's success (Matz-Costa et al., 2019). Peer roles, intervention modality, and the quality of relationships between peers and intended recipients of peer support are salient moderators that influence the effectiveness of peer-based PA interventions (Martin-Ginis et al., 2013; Matz-Costa et al., 2019). Thus, it is critical that in ERS contexts, prospective development research is conducted to ensure peer-based interventions are acceptable for whom they are designed and implemented with fidelity (Yardley et al., 2015). Doing so can maximise the effective use of peer based ERS interventions.

The social identity approach can serve as a useful theoretical framework in ERS settings to understand the interpersonal processes involved in forming successful relationships between peers and their intended recipients (Stevens et al., 2017). Specifically, the social identity approach posits that an individual's sense of self is infused and transformed by their group memberships (Tajfel, 1970). There are two salient social processes underpinning the adoption of shared social identity: (1) *categorisation* – awareness of salient similarities that collectively bind group members together, and (2) *identification* – perceiving group belonging as being positive and desirable (Levy et al., 2019). Individuals possess multiple social identities linked to their sex, age or profession, which in turn, influence perception, cognition and behaviour

(Haslam, Reicher, & Levine, 2012). When individuals perceive themselves as a member of a shared social group, they view other members more positively (Guth et al., 2008; Foddy et al., 2009) and are more receptive to their support (Greenaway et al., 2016). Appropriately, previously successful peer-based PA interventions have adopted same age and/or sex matching peer assignment strategies to bolster perceptions of sameness between peers and recipients (Beauchamp et al., 2018; Owen et al., 2018). However, the heterogenous context of ERSs in respect of client age, sex and health status may preclude the ability to recruit peers using comparable demographic criteria. Critically, the adoption of shared social identity is not dependent on perceived demographic similarity (Turner, 1982). Still, from a social identity perspective, the prospective acceptability of ERS peers is inherently indebted to the extent to which they are able to represent and reflect the ERS group. Therefore, there is need to identify salient factors which influence perceptions of shared social identity among ERS participants.

Yardley and colleagues (2015) advocate the adoption of a person-based approach as a means to develop behaviour change interventions centred on the perspectives of people who will use an intervention and the context within which it will operate. This approach seeks to acquire a deeper understanding of individuals who will be using, and delivering the intended intervention, prior to implementation (Yardley et al., 2015). Eliciting client and provider perspectives can help establish ownership, prospective acceptability and widespread support which are essential for successful implementation of complex behavioural interventions (O'Brien et al., 2016). Moreover, given the paucity of evidence to document the structured integration of peer support within an ERS context, adoption of a person-based approach will aid identification of perceived barriers and practical considerations, prior to intervention development.

The primary aim of this study was to employ a person-based approach to inform the development of a peer-based ERS intervention. ERS client and provider views were sought on salient demographic and personal characteristics of prospective peers to maximise their perceived acceptability. Further, feedback on optimal peer roles and implementation strategies were sought to optimise the development of a peer support intervention.

Method

Participants

Participant eligibility criteria were determined by whether the individual was either a current or recent AWL client or responsible for AWL provision (n = 14). Using an opportunistic sampling strategy, 10 participants (4 = female), were recruited who were either currently undertaking (n = 6), or had recently completed (n = 4) AWL. Participants age ranged from 56 to 88 years (70.4 ± 8.2 years) and all identified as White British. Primary reasons for referral were: (1) joint pain (n = 2); (2) chronic obstructive pulmonary disorder (n = 2); (3) CVD (n = 1); (4) type-II diabetes (n = 1); and (5) an unspecified reason associated with poor psychological well-being (n = 1). The remaining participants presented a comorbidity of physical and psychological reasons for referral and were unable to identify a primary reason (n = 3). The remaining four participants included three exercise referral officers (EROs) and one operational manager charged with overseeing the scheme. EROs ages ranged from 36 to 48 years (42 ± 4.9 years), with 10.5 to 25 years professional experience within ERSs.

Data collection

Institutional ethical approval was obtained prior to data collection. Data collection commenced between May and August 2019. Interview length for clients and EROs ranged from 23 to 66 minutes (Mean duration = 37 minutes), and 32 to 48 minutes (Mean duration = 43 minutes), respectively. The interview with the operational manager lasted for 53 minutes. Interview guides (see appendix C) contained questions pertaining to demographic and personal characteristics of peers, as well as prospective roles. For providers only, there was an additional focus on factors perceived to influence peer implementation. The interview process adopted a reflexive, iterative approach, where interesting and/or unanticipated issues raised by clients were addressed in subsequent interviews. Engagement in such convergent interviewing

practice ensured all participants were able to contribute their perspectives on similar topics (Williams & Lewis, 2005).

Data analysis

Using guidance set out by Braun and Clarke (2013), the data were analysed thematically (see methods section for full discussion of methods, chapter 3, p59 – 61.).

Results

Four main themes were constructed to reflect perceived prominent factors for successful AWL peer implementation. The first theme focussed on the salience of peer demographic characteristics. Participants discussed perceived peer acceptability in respect of age, sex, and physical appearance, as well as peers' health status and previous AWL experiences. In Theme Two, participants discussed desirable peer personal characteristics. AWL clients emphasised the need for peers to be approachable and exude positivity, whilst providers stressed the importance of high-level interpersonal skills. Theme Three demonstrated how peers were perceived as additional sources of emotional, motivational and informational support, with participants offering feedback for how peers could provide this support within the context of AWL. The final theme documented the prospective acceptability of peer implementation. Participants provided insight on preferred strategies for integrating peers within the existing AWL structure, as well as highlighting practical considerations for the recruitment and management of peers.

Demographic characteristics

Participants did not indicate strong preference for recruiting peers on the basis of salient demographic characteristics. As highlighted by Mary (provider), peer sex was considered to be inconsequential: "I don't think it matters, male or female, erm…I think it's more of an equal thing now, rather than being predominantly female dominated. I think it can be either". Tony's (client) account below demonstrated harmony between the views of providers and clients:

> Well I don't think that really matters, I think that's, you know, I think that the thing is really, they just need to have a positive… they have to have been through the experience and they have to be positive about the whole thing.

Samuel described how the importance of peer age was similarly disregarded by clients: "They can be 5 years old; they can be 100 years old. Doesn't matter, does it? Age is only a number". However, Sharon (provider) expressed preference for peers to be aged ≥50 years to aid compatibility with the majority of those who accessed AWL:

> I think someone who's 50+, I would say. Which is, you know, more than 50% of our clients are 50+…erm…so, I think in that sense, the age thing is important because they can then relate more to the clients that we're actually having in.

In a similar vein, Sharon anticipated acceptability to be enhanced if peers were able to display a 'normal', non-threatening appearance:

> The more they look like your everyday person and not a gym buddy who's going in in the full gear, and they're just normal baggy t-shirt, trackie bottoms type person, is far more appealing than having someone who is the…pre-determined gym person…you know?

In contrast, clients perceived the physical appearance of peers to be irrelevant, as articulated by Phillipa: "I don't think that's [physical appearance] an issue, it's the advice that you're going to get from that person, you know, it's not what they look like". Clients did, however, highlight the perceived benefit of recruiting peers with personal experience of the specific medical condition in which they themselves were facing. Clients perceived this to represent a basis for empathetic understanding between peers and recipients, as well as allowing peers to offer bespoke guidance tailored to individual needs. As explained by Phillipa below:

> I think that'd be, they would know…erm…what they're going through and, you know, what issues they've faced, or what they're going to face. And maybe on that…on that, on them, they can say maybe, 'don't do it this way, do it that way, because it'll be easier for you.

Expanding on this concept, Suzanne (client) discussed how the experience of "going through something" could suitably act as a foundational platform for relatability: "Usually, if you've gone through something yourself, you'll have some idea. You can relate to those people because you've been there". Sarah (provider) suggested experiences of poor psychological well-being represented a common denominator amongst ERS clients:

> I don't find a lot of my clients, I mean yes, they'll say that they want to lose weight, but it's never their primary situation that they want to go through. It tends to be, I find most people's flaws are the mental health side.

Participants unanimously stated the importance of peers' having previously completed AWL themselves. As expressed by Frederick (Client): "I do think that it would be important that they had been through the scheme, yeah. Because otherwise, they're just another person coming in aren't they. You don't know the ins and outs of it". Further, Kevin (provider) discussed how peers' own AWL experiences could be used as a basis to assess their credibility and appropriateness for peer roles.

> You're looking for someone who has completed the service, someone who's done well on the service, because obviously, there's no point in having a champion if you've not done very well. You can't motivate somebody else to do a good job, when you've not put the effort in yourself.

Personal characteristics

All participants identified desirable peer personal characteristics. It was evident that clients considered certain personal characteristics to be critical to the success of the future peer intervention. As explained by Gladys (client), affability was highlighted as a key personal characteristic: “It’s someone that you can go to and you can speak to and you don’t have to feel daft or stupid, do you know what I mean? Someone like that who puts you at ease”. Likewise, clients emphasised the importance for peers to be “positive people”. Clients characterised positivity as an ability to demonstrate an adept conversational style and a good sense of humour. This is reflected within Phillipa’s (client) description of desirable peer personal characteristics: “I think they’d have to be quite outgoing. Erm…and, a very sociable person…to be able to talk to anybody, on any subject…not any subject but anything, sort of, to do with the gym”. Moreover, participants deemed it essential that peers exhibit a compassionate, non-discriminatory and empathetic demeanour. Susan (client) succinctly summarized this view: “If you don’t have empathy, it’s not going to work. Because you’ll find that people that don’t have empathy, tend to get impatient, very quickly”, which Sharon (provider) shared: “They [peers] need to be approachable, they need to be understanding of the person that’s standing in front of them, their needs, more emotionally than the professional side, because obviously the professional side is us”. Providers also highlighted desirable peer characteristics that fell under the remit of professionalism. These characteristics primarily converged around competent listening and organisational skills, skills which Sharon (provider) deemed critical for ensuring that peers strictly adhered to their prescribed roles and responsibilities: “Obviously a level of responsibility where they know how to act, they need to be good communicators, they need to be able to listen, they need to know their boundaries”. Sharon’s observations were reiterated by Kevin (provider), underscoring their perceived salience to subsequent peer’s success: “It would be someone who is able to follow instruction, to work within their boundaries of what we’re asking them to do and go no further”.

Roles and responsibilities

Participants were enthusiastic about the prospective integration of peers within AWL. Peers presented a means to provide greater levels of emotional, motivational and informational support to those accessing the scheme. Phillipa (client) described how peers could provide emotional support via social interaction, positively influencing client's mood and attitude towards exercise on "bad" days: "Maybe you've gotten up and you don't feel that good, you're going to the gym and you don't…when you get there, you don't feel like doing it…you know, if you can just talk to someone and…they bully you up". Thomas (client) elaborated further by suggesting the integration of peers may facilitate a more communicative and socially supportive AWL environment:

> If you've got somebody who was introducing people to each other…because some people can be quite shy, as you're aware. I'm not, I'm quite open. But I've noticed some people…some people you can say, 'good morning', to and they'll give you a nod, they're very difficult to engage in conversation.

Providers shared the view that structured peer support would enhance opportunities for emotional support. Kevin (provider) believed peers would be able to fulfil this role by regularly showing interest in client well-being: "Just having someone to, you know, encourage them, 'how are you feeling at the moment?', 'do you feel good?', 'on a scale of one to ten', that kind of stuff, just doing basics". Participants also discussed the roles that peers could play in enhancing motivation. Sharon (provider) suggested peers could promote feelings of resilience and persistence, qualities deemed especially valuable for clients within the early stages of AWL:

> It's proof to other people that…you can do it, basically. And, especially in weeks 1, 2, 3, when people are struggling because they've never been in a gym before, for whatever reasons, and you've got someone there who just looks like a normal, everyday person, to say, 'well, I did it. If I can do it, you can do it'.

Suzanne (client) discussed how peers could enhance motivation by demonstrating empathetic understanding of client's specific medical condition(s), as well as encouraging them to embrace a positive outlook and strive towards the achievement of future goals:

> That's very important, you know, to be able to say to them, 'look, erm…your life has changed, definitely. And perhaps, you can't do the same things as you used to do, but it doesn't mean that your life stops, you know, you still have…erm…dreams, you still have motivation, you still have things that you haven't achieved'.

Participants saw the introduction of peers as a means to provide additional informational support, lessening some of the burden on AWL providers. Phillipa (client) considered peers as affording client's extra opportunity to ask questions and seek reassurance on their exercise behaviour:

> I think it would be a good idea, you know, for older people to be able to go to someone and just say…'What do you think about this?', 'Do you think I'm doing this right?', 'Do you think I'm doing that right?', instead of, sort of, going to [exercise referral officer] all of the time.

Peers could also offer detailed explanations of the AWL process. Mary (provider) considered this to be especially beneficial for new clients by ensuring they had a comprehensive understanding of what AWL participation would entail:

> Explain a little bit about the process of the referral scheme if they're pretty new on it, so that the participants have got a better understanding, because sometimes when they come in for consultations, they don't always grasp what the 12-week period is about.

Participants were also quick to highlight behaviours and roles which should not be performed by peers. As described by Sharon (provider), it was considered unsuitable for peers to offer technical advice on the exercise behaviour of clients, such as dose, intensity or choice of physical activity: "As long as they don't run away with themselves, giving advice that is, potentially, not professional advice… knowing that is not their role within the gym. I think we've got to be quite clear on that from the start". Similarly, Mary (provider) expressed a need to take measures to prohibit peers from asking probing personal questions to preserve client privacy:

> So that they knew the boundaries of like, questions they [peers] could and couldn't ask, because, as a volunteer, they don't need to know the background of that person…the volunteer not to quiz them about why they're here…erm…I think that is a big, big thing, because you will get some volunteers who will cross that line.

In this regard, establishing and respecting 'boundaries' represented a common thread among provider responses, emphasising the need for clear delineation of what peers' roles would be.

Practical considerations for peer support integration

Providers offered pragmatic insight for how to integrate peers within the existing AWL structure. Sarah (provider) perceived peer-based sessions should be incorporated within day-time supervised sessions to maximise client acceptability:

> It would be very much day-time orientated, people wouldn't come for the evenings, for group sessions, erm…and I would say…I hate to say this, but I have a feeling it would be more age orientated, as well. Erm…from what I've witnessed, I would say it's more the older generations that want to have that socialisation.

In part, this was based on the belief that peer support would be deemed most acceptable among older AWL users, who were most likely to access the scheme during the day. A view shared by Sharon (provider):

> Waste of time if there's…we put on early morning sessions, obviously to accommodate people who go to work, which isn't our highest rate of clients. So, it'd be pointless brining in a volunteer on an 8-9 session, when the clientele who are coming in are going straight…do their stuff, straight to work.

Providers agreed that the most appropriate implementation strategy would involve identifying and recruiting peers who could commit to the role on a consistent basis. Kevin (provider) explained: "I'm assuming the person that we would want; this needs to be a regular commitment, they can't just bob in like once every month or once every three weeks, you would need to have some structure to it". Mary (provider) reiterated the perceived importance of peer commitment:

> It's making sure that they've got time to commit, because commitment is a big thing, because you don't want somebody that is going to commit for a couple of weeks, or a week, and then they decide that it's not for them.

Sharon (provider) elaborated on the preferred duration of short- and long-term peer commitment:

> I would say, two-three times a week, which is probably…if they did the minimum when they were actually on the course, that's what they would have committed to anyway, so they would've had to free up twice a week to come on the course. And, most people come more than the minimum. So, I would say two to three, for three months. I would say do it on a 12-week basis, because that's what they've been used to.

However, Sharon (provider) acknowledged both short- and long-term commitment would ultimately be decided by peers' themselves: "Obviously, you want to keep the same volunteers on a regular basis, but the nature of volunteering…speaks for itself, doesn't it? You can't say to them, 'you need to be in three days this week', it's up to them". Kevin (provider) anticipated unexpected changes in family and health-related circumstances to be a significant barrier to long-term commitment:

> My only concern is whether or not people can commit to this, because obviously people look after grandchildren and holidays and what not, and whether they come back, don't forget the reason why these people are on the GP referral service is that they obviously have a medical reason and we often find that people have relapses in their referred condition.

Incentives were discussed to promote commitment and express appreciation of peer roles. Kevin (provider) supported the prospect of offering incentives: “It's whether we could offer them something like a free month’s membership, or six months, or something to make them feel valued (…) if we don't incentivize the champion, they might get disheartened and then not attend”. Interestingly, client perspectives were much more varied. Phillipa (client) remarked how the act of being identified as a prospective peer would be sufficiently gratifying: “I think the reward would be in being asked…really. That people thought that you were good enough to become a champion and help in the gym. I think that would be rewarding enough”. However, Frederick (client) appeared less certain: “Erm…I would imagine that you would have to get paid to do it. You’d want paying to do it, erm…maybe someone would volunteer to do it, I don’t know”. Gladys (client) didn’t consider it essential to provide peer incentives, though also discussed free gym memberships as a prospective option: “I wouldn’t know what you’d be…maybe a membership to the gym or…me, I wouldn’t expect anything for coming, it’d just be nice”. Thomas (client) supported the apparent acceptability of free gym membership for peers: “Well, I guess anybody would expect rewards or benefits. Even if it’s gym membership, or something like that”. Notwithstanding, the notion of free gym memberships represented a considerable financial commitment for AWL. Sharon (provider) expressed some caution, highlighting the need to consider how to reward peers proportionately in accordance with the value they add to AWL:

> It’s just managing it, isn’t it? Because if you give it them, you say, ‘right, you’re a volunteer for the month of March, so you can come in free for the month of March’, if they only come in and volunteer 3 times, but then they’re in of their own accord for another 5, 6, 7 and whatever…then I think that’s when the gym start thinking, ‘hang on a minute, what’re we getting for this?

There were inherent practical and cost-based implications of the prospective peer support intervention related to incentives. Incentives were widely recognized as a means to promote peer commitment, however, the offering of incentives directly influenced potential peer capacity. Alternatively, if only a handful of peers could be incentivised, this may increase dependency on a select number of peers. As described by Sharon (provider): "The more volunteers you have, the less…you're putting on that one person". Sarah (provider) considered recruiting more peers as a valuable strategy for maintaining peer enthusiasm and mitigating against adverse changes in peer well-being:

> You don't know the pressure that that person, that champion, could end up feeling under, do you know what I mean? Because it is a volunteer set up, at the end of the day and you do want it to be an enj…a happy environment, you don't want it becoming a job, do you know what I mean, it wants to be something that they still enjoy, that they're still passionate about.

Discussion

AWL clients and providers discussed preferences for demographic and personal peer characteristics, as well as highlighting prospective roles and acceptability considerations. Clients disregarded the importance of demographic similarity between themselves and peers, though emphasised the saliency of personal characteristics, such as positivity, humour and empathy. Providers recommended recruiting peers aged 50 – 75 years to align with the prevailing demographic characteristics of AWL's clients. Providers also highlighted the importance of adept listening and organisational skills. Collectively, peers were perceived to enable greater provision of emotional, motivational and informational support to AWL clients. However, providers steadfastly underscored the need for clearly defined boundaries to ensure strict adherence to agreed peer roles. Participants anticipated older AWL clients to be more receptive to peer support, recommending peers to be optimally positioned within day-time sessions when older clients typically access the scheme. Providers indicated preference for individuals to commit to the peer role on an ongoing basis, though cautioned against the unpredictable nature of ERS peers health status. Client and provider perspectives were divided regarding the importance of peer incentives as a means to promote ongoing commitment, as well as how and when peers should be incentivised.

AWL clients did not indicate preference for peer recruitment to be targeted on the basis of age, sex, or physical appearance. Similarity in terms of age and/or sex is positively associated with peer acceptability (Embuldeniya et al., 2013), and is a common peer matching assignment strategy within successful peer-based PA interventions (Beauchamp et al., 2018; Owen et al., 2018). This is consistent with the provider's preference for recruiting peers aged 50 – 75 years in order to enhance peer acceptability among the most prevalent age group of AWL's users. However, age and/or sex similarity is not critical to the development of positive

peer-recipient relationships within health-related contexts (Veith et al., 2006; Cooper et al., 2017). Within a rehabilitation context, shared illness-specific experiences can transcend the importance of perceived similarity of age and sex (Veith et al., 2006). Similarly, AWL clients discussed how shared experience of a medical condition would enhance peers' understanding of lived experiences and their subsequent ability to offer bespoke practical advice. Veith and colleagues (2006) described the merits of assigning peers based on the shared experience of spinal cord injury, however, assigning peers in this manner may not be achievable within ERSs where vast heterogeneity exists among the reported health conditions of participants (Wade et al., 2020). In this study, clients were perceived to be bound together via shared anxieties over health-related conditions. Clients explained how shared experience of having '*gone through something*' would be sufficient to promote perceptions of similarity and relatability among peers and clients. Shared experiences of poor health enable a deeper level of trustworthiness and rapport between peers and clients than can be accomplished by health professionals without comparable lived experiences (Englander et al., 2019). All participants regarded prior AWL completion as an essential requirement for prospective peers. Further, providers advocated future peer recruitment decisions to be informed by peers' past experiences as AWL clients. The social identity approach posits that a leader's (e.g., peer's) effectiveness is determined, in part, by the extent that they are able to represent their group (i.e., their group prototypicality) (Turner et al., 1987). The above findings demonstrate that similarity in terms of age, sex, and/or medical condition were not perceived to be critical to the development of positive peer relationships in an ERS context. Instead, the shared experiences of ill health and prior completion of AWL were fundamental to perceptions of sameness and, thus, represent the basis for social identification among peers and clients. Nonetheless, it was deemed advantageous if peers were able to share first-hand experience of client's medical conditions. In this regard, peer similarity in demographic characteristics and medical conditions may

provide additional benefits for clients with comparable demographic profiles. In the current study, providers considered those aged between 50 – 75 years, and those referred due to a mental health condition to be the most prevalent users of ERSs. Therefore, where possible, recruiting peers according to this demographic profile may further enhance perceptions of sameness between peers and clients and aid adoption of shared social identity (Beauchamp et al., 2018).

In contrast, participants consistently identified desirable peer personal characteristics. Desirable peers were positive individuals who were buoyant, approachable and able to provide advice. A positive disposition is frequently cited among the most salient peer characteristics (Estabrooks et al., 2004; Kritz et al., 2020). Here, participants endorsed peer positivity as a means to lessen health-related concerns among AWL clients. Such findings align with Kohut et al. (2018) and Edmunds, Sitch and Lowry (2020) who found that peers can allay participant concerns by normalising feelings of apprehension and providing reassurance for the future. Similarly, Kritz et al. (2020) state positive peers have the capacity to distract participants from their problems. In the context of ERSs, early social interactions with positive peers may mitigate against the often-cited fears associated with entry to an unfamiliar exercise environment (Moore et al., 2013). Such fears are typically rooted in upwards social comparisons related to the physical appearance and functioning of other exercisers, compounded by personal health-related concerns (Morgan et al., 2016). Thus, this study reaffirms the saliency of peer positivity, highlighting the capacity in which it can facilitate enhanced mood and ongoing commitment among ERS clients by mitigating social and health-related anxieties. Further, participants were unwavering regarding the fundamental importance of peer empathy. Similar to Kritz et al (2020), participants cited empathy alongside analogous personal characteristics of patience, tolerance, and understanding. Peer demonstrations of

empathy promotes reciprocal awareness of a shared journey towards enhanced health and facilitates the development of positive peer-recipient relationships (Cooper et al., 2017; Moon et al., 2017). Moreover, the foundation for positive peer-recipient relationships are rooted in recognition of peers and clients striving towards the same goals, thus enhancing perceived similarity and the likelihood that shared social identity will be adopted. Accordingly, desirable peers are suitably adept in their ability to understand and share the experiences of a demographically diverse range of AWL clients. Indubitably, clients regarded positivity and empathy as critical characteristics of a desirable AWL peer. The extent to which peers can exude such behaviour, across a wide array of social interactions with a diverse range of AWL clients, is seemingly fundamental to their ability to cultivate and maintain a shared sense of social identity within ERSs. In addition, providers highlighted the importance for prospective peers to possess adequate interpersonal and organisational skills. These skills are considered fundamental for peer implementation success in health- (Tobias et al., 2010; Englander et al., 2019), and PA-related contexts (Tobias et al., 2010; Englander et al., 2019), such as community-based peer-led PA programmes for older adults (Hawley-Hague et al., 2014; Kritz et al., 2020).

Peer roles are typically situated within the broad categories of providing emotional, appraisal, and informational support (Dennis, 2003). Within the current study, prospective peer roles were more appropriately categorised under the headings of emotional, motivational, and informational support. Dennis' (2003) conceptualisation of appraisal support is consistent with the prospective motivational roles identified by participants in the current study, such as peers providing encouragement to persist in problem resolution and reassurance that continued efforts will result in positive outcomes. However, the term 'motivational' adds greater clarity for the anticipated types of support peers can offer in an ERS context. Consistent with Kritz et

al. (2020), prospective AWL peers were deemed able to provide emotional support by showing ongoing interest in client well-being via social interaction. The opportunity to socially interact with peers with comparable life experiences is associated with decreased feelings of isolation and increased belonging (Moon et al., 2017). Participants also suggested peers should act as linchpins to stimulate greater social interaction amongst AWL clients. Edmunds and Clow (2016) found a peer-initiated support network facilitated the development of companionship, camaraderie, and exercise group identity, which were associated with enhanced PA in a workplace context. Within exercise referral, relatedness (i.e., a sense of belonging among clients) is positively associated with exercise adoption and ongoing adherence (Edmunds et al., 2006; Rahmann et al., 2011; Eynon et al., 2019). There is though, little evidence of strategies to promote relatedness within an ERS context. The current study demonstrates that ERS clients are acceptable to peers acting as influential social agents, who have the capacity to stimulate relatedness and yield comparable benefits for client engagement and PA outcomes.

Peers were also valued for their ability to act as physical representations of the successes and health-related improvements that AWL participation may yield. Recognition of peer success fosters client beliefs that they may be able to achieve similar health-related improvements by engaging in similar PA behaviour (Moon et al., 2017; Miyawaki et al., 2018). Accordingly, peers can act to promote self-efficacy, which is low among new ERS clients and positively associated with scheme completion (Eynon et al., 2019). Peers were regarded as supplementary sources of informational support who would be able to address client queries on a variety of topics. Principally, peers were envisioned to provide non-specialist informational support pertaining to the structure and logistics of the scheme. However, peers with shared medical conditions may be able to offer tailored advice to clients that extends beyond the capacity of EROs without comparable lived experiences (Kohut et al., 2018).

Providers highlighted the critical importance for roles to be explicitly defined and agreed prior to peer implementation. Adherence to agreed role boundaries is essential for ensuring client safety within health-related contexts (Tobias et al., 2010; Englander et al., 2019). This is particularly relevant to ERSs, which involve a prescriptive PA component and are accessed by those with complex and severe medical conditions. Participants expressed that peers should act as supplementary sources of support under the guise of EROs only, identifying certain roles that peers ought not to perform, such as the specific offering of advice related to PA type, mode or intensity.

Providers also advised how to implement peers in a capacity that maximised their acceptability and scope. They considered peers to be optimally situated within the busiest day-time supervised sessions, where clients and EROs could simultaneously benefit from the additional support. Additionally, these sessions would be primarily accessed by older AWL clients who were anticipated to be most receptive to peer support. These views are consistent with Tobi et al. (2012) who reported greater appreciation for social interaction among older ERS clients. Providers expressed a desire to recruit peers who could commit to the role on an ongoing basis, though in line with Wurzner et al. (2017), concerns were raised regarding the viability of this approach due to unpredictable changes in peer health status and other commitments. Discussions for how to promote peer commitment incited deliberation on the entwined nature of peer incentives and the number of recruited peers. As reported by Corder et al. (2016), incentives present a means to facilitate ongoing enthusiasm and commitment to peer roles. In the current study, free gym memberships were described as desirable incentives for peers, however, there remained uncertainty regarding what constituted a proportionately cost-effective reward for a peer's contribution to the scheme, and when peers should be rewarded. Peer support utilisation is endorsed as a cost-effective delivery strategy within

health-related contexts (Hulteen et al., 2019). However, the ability to determine cost-effectiveness of peers within ERSs may be limited due to peers acting in a strictly assistive capacity, complementing EROs rather than replacing them. Hence, whilst providers discussed the anticipated merits of recruiting a greater number of peers to reduce pressure on select individuals, budgetary restrictions were predicted to restrict the prospective acceptability of this approach.

Conclusion

This exploratory qualitative study elicited AWL client and provider perspectives to inform the development of a bespoke peer based ERS intervention. Participants discussed the saliency of demographic and personal peer characteristics, as well as prospective peer roles and peer acceptability. The findings from this study informed development of the AWL peer support intervention in the following ways: First, the high volume and likely heterogeneity of AWL clients, and scheme budgetary restrictions, made it impossible to implement peers on a one-to one basis. Positively, as participants identified perceptions of similarity and commonality among AWL clients, peers may be suitably administered on a one-to-many basis, dependent on peer ability to demonstrate salient personal characteristics. Second, participants did not express strong preference for peers of a particular sex, suggesting males and female peers to be equally acceptable. Similarly, there are no apparent benefits to recruiting peers on the basis of experiencing specific medical conditions. Peers must have completed AWL and experienced some form of positive physical and/or psychological outcome attributed to their participation. Though AWL clients did not indicate peer age preferences, providers recommended a peer age range of 50-75 years to be consistent with those most likely to access ERSs (Wade et al., 2020). ERS peers must be positive, friendly and approachable individuals who are able to express empathy. Finally, all participants advocated for an equitable peer-recipient relationship, without vast power imbalances between peers and AWL clients (Matz-Costa et al., 2019). This is consistent with the central tenets of the social identity approach, as perceived equality will enhance perceptions of similarity, thus facilitating the adoption of shared social identity. Peers are ideally placed to complement the technical expertise of existing EROs by focussing on the provision of emotional, motivational and informational support, rather than offering prescriptive PA advice. Further, to ensure the protection of AWL stakeholders, providers, clients, and prospective peers, peers must receive detailed guidance

regarding expected peer roles. It is also recommended that peers are asked to sign a declaration to indicate clear and sufficient understanding of roles, prior to implementation. The subsequently developed peer recruitment and training protocols are provided below.

It is important to emphasise that this study focusses on transferability rather than generalisability, as considerable heterogeneity can exist between different ERSs (Wade et al., 2020). In this respect, peer roles identified here may need adaptation for use within different ERSs. Nonetheless, this study has been able to provide key provider and client insight on how peers may be integrated within an ERS context, as well as providing accompanying evidence that such an approach is acceptable. Moving forward, this study can assist providers in incorporating a structured peer-based social support component within ERSs. ERS providers are encouraged to follow the guiding practices of this study to identify contextually specific needs, anticipated implementation barriers and resource-related considerations. Wider uptake of peer-based approaches may allow future research to evaluate the impact of peer-led social support interventions on ERS effectiveness.

PEER Identification Checklist

Upon consultation with users and providers of the AWL Active Gym service, these are the relevant criteria to aid identification of suitable PEER candidates:

Demographic Characteristics

Age – The PEER should be aged between **50 to 75 years old**.
Sex – Suitable PEER candidates can be **Male or Female**
Background – It is preferable, but not essential, for PEERs to be long-standing residents (i.e., 20+ years) of the community where their gym facility will be located.
Previous AWL completer – The candidate should be an individual who has **previously completed Active Gym**.

- Additionally, the most suitable candidates will be those who attended supervised sessions regularly throughout their time on Active Gym

Medical Condition/Physical capabilities – PEERs may present with a **variety of acute or chronic medical conditions** as long as they can **use the gym facilities safely without the need for additional supervision or support.**

Personality Characteristics

The PEER must be recognisable as somebody with **good interpersonal skills** as their role will involve interacting with the breadth of the varying Active Gym users. He most suitable PEER candidates will be those who have demonstrated themselves to be/have:

- **Friendly and approachable**
- **Positive**
- **Down-to-earth (i.e., no evidence of an overbearing Ego or power trips)**
- **Compassionate**
- **Empathetic**
- **Sense of humour**

IMPORTANT – This document is intended to be used as guidance for the selection of potential PEERs. However, given the extent to which Active Gym users may differ with regards to their physical characteristics and demeanour, it is not possible to provide definitive prescriptive guidance.

HOWEVER – Suitable PEER candidates will be individuals who have had **some form of positive (physical or emotional) transformation which they attribute to their AWL participation and are willing/able to communicate this effectively to other Active Gym users.**

PEER Volunteer Toolkit

(For peer training purposes)

This document has been designed to inform you of your roles and responsibilities as a PEER volunteer and to provide additional guidance and examples for how to perform the role successfully.

Background to Active West Lancs (AWL).

This section has been designed to provide a brief reminder of the process of AWL and relevant information for you in your role as a PEER.

1) Prospective AWL clients are individuals who have been either GP or self-referred to the scheme on the basis that they experience some form of physical and/or psychological medical condition.
2) Eligible clients have an initial appointment with a trained GP referral officer where they discuss details of their medical condition. During this appointment, clients also provide

information pertaining to their physical condition, e.g., weight, height, age, physical activity levels, and complete a series of questionnaires. **This process is repeated on weeks 6 and 12 to track client process.**

3) Following their appointment, clients are given a full gym induction, where they are instructed on how to use the exercise equipment and provided with a bespoke exercise programme card relevant to their fitness goals.
4) AWL clients are then granted access to the gym on a Tier One basis. Tier One clients can only access the gym during GP referral officer supervised session times. These sessions run throughout the week, with sessions typically lasting 2 hours (e.g., Monday 1pm – 3pm). However, these session times vary on different days. **Please see attached for a copy of the supervised session timetable.**
5) After demonstrating to GP referral officers that they are competent and safe users of the gym (approx. 4-6 weeks following initial induction), clients may progress onto Tier two membership. Tier two clients can access the gym unsupervised at their own discretion (including weekends), though are encouraged to attend at least one supervised session per week.
6) Upon completion of their 12-week appointment, AWL clients are able to continue using the gym at a discounted rate of £75 for 6 months. This amount is payable upfront in one sum.
7) During their time on the scheme, clients can also access the swimming pool at their local facility, as well as a number of additional free AWL services. These services include, but are not limited to, Weight management (Active Weight), Tai Chi and Health walks. **Please see attached for a leaflet containing details of the other services AWL offer.**

Role outline

The following section outlines the role of a PEER volunteer and provides information on why the role is important.

WHAT – As a PEER, your role will be to assist GP referral officers to help cultivate a positive social environment within your local AWL gym facility.

WHY – The AWL gym facility is made up of an eclectic mix of individuals of varying ages, backgrounds and reasons for referral. As such, those who use AWL can experience feelings of social isolation and not feel confident interacting with their fellow AWL users. Historically,

these factors have contributed to lower levels of AWL attendance and completion. In response, the integration of PEERs has been designed to provide AWL users with additional sources of social and motivational support.

HOW – Using a framework approach, there are four categories of support PEERs will be expected to provide to AWL users.

- **Practical** – E.g., non-specialist assistance using exercise equipment
- **Informational** – E.g., general guidance on exercise and gym facilities
- **Motivational** – E.g., positive messaging
- **Emotional** – E.g., help clients feel at ease within a gym environment

(More detailed guidance on how to provide each type of support will be provided under the 'Guidance' sub-heading below)

WHEN – You will be expected to be able to commit to 2 sessions per week during the advertised supervised session times (E.g., Monday 1pm – 3pm or Tuesday 1pm – 3pm) for a duration of 12 weeks. During this time, you are also permitted and encouraged to continue using the facilities as part of your normal exercise routine, whilst also offering additional support in your role as a PEER.

Responsibilities

As a PEER, you will have a dual role as both a provider and facilitator of social support for AWL users. That is, alongside offering support to AWL users yourselves, you will also be involved in linking other AWL users together with the aim of developing a friendly and cohesive gym environment. In this regard you have two main responsibilities:

- To welcome and support new AWL users within the gym
- To act as a social lynchpin by instigating and encouraging social interaction between AWL members.

Guidance

As mentioned above, the support provided by PEERs will be represented by the following four interrelated categories;

Practical

Description - All AWL users will have undertaken a gym induction led by a trained GP referral officer and provided with a bespoke exercise programme card. However, many users have

limited previous gym experience and may still have questions about some aspects of the gym and/or gym equipment which they may not feel comfortable asking a GP referral officer. As a PEER, you are well placed to answer and assist with any general questions that AWL users may have in this area. For example, an individual may ask how to adjust the seat on an exercise machine, how to modify the weight on an exercise machine or how to turn on cardiovascular equipment, e.g., an exercise bike.

Note - It is not the role of PEERs to provide any specialist advice pertaining to exercise performance, such as, exercise technique, exercise intensity, or exercise frequency that does not reflect the specific information of a client's exercise programme card. If an AWL user asks you any questions you believe to cross this line to require specialist advice, you must then pass this advice on to the GP referral officer.

Example – As a PEER, an appropriate form of practical support would be to assist AWL users during their workouts by informing them of the next activity on their programme card and encouraging clients to stick to the details of the approved exercise programme. Similarly, it would be appropriate to show an AWL user how they could modify an exercise machine to make the weight heavier or lighter.

Case study one - *"Erm…she had a problem getting on and off the machine. And the GP referral officer would run everywhere, and had to put her leg in, she has a problem with her leg. So, I would say, 'Oh, hang on, I've got an able body here, the GP referral officer's got another person that they're trying to put on another machine', so, I would put, with the GP referral officer's advice, let her sit on, and then I'd lift her leg for her, and she started to build up a rapport with me and I would make her laugh…I'd go, 'well, it's a good job you've not got 4 legs', and she would see then that there was a release, that she could find somebody that she could relate to and that she could laugh"*

Case study two – *'Read the client's programme card and go, 'right Barry, now it's time for the chest press, has the GP referral officer showed you how to use the chest press?', 'Oh yeah, I know how to use it', 'Right, lovely, you're doing three sets of 15 at weight 6'. 'So, how're you getting on with your training?', 'yeah, I'm really enjoying it, I think it's going really well, yeah I'm thinking about working…I'd like to do some more exercises for my legs', 'oh really, right I'll tell the GP referral officer that'*

Informational

Description – As a PEER, you are well placed to assist clients by answering any questions relating to the AWL process, especially during busy periods when the GP referral officers may be assisting other clients. In this regard, PEERs are expected to have a basic understanding of the AWL process and other services offered by AWL. This includes;

- Details of the referral process (i.e., induction, 6-week and 12-week appointment process)
- Details of supervised session times and gym access (i.e., Tier one and Tier two gym access times)
- Variety of other services available to AWL clients (e.g., Health walks, Weight management service)

A PEER may also respond to any other relevant questions AWL users may have pertaining to their gym use and/or the AWL process.

Note – Please defer to the GP referral officer for further advice if presented with AWL-related questions you feel unable or unqualified to answer.

Example – During your interactions with AWL users, it may be appropriate to ask or remind AWL users about any upcoming appointment dates, for example, *'ah Barry, don't forget that you've got your 6-week review in two weeks', 'Oh God, I'd forgot about that'.'*

Motivational

Description - As previously highlighted, many who enrol onto AWL fail to see the scheme through to completion. As a PEER, you represent the successes that may stem from taking part in AWL. By sharing details of your own positive journey, including any potential highs and lows throughout the process, it is considered that such information may help to motivate AWL users to persist with the scheme. In this regard, when times may get difficult for AWL clients, positive PEER encouragement and gentle reminders that scheme completion can lead to an array of positive and psychological benefits, may make the difference between an AWL user staying on the scheme, or dropping out. As a PEER, it would be appropriate to share information pertaining to your own gym use and details of relevant personal experiences during your time as an AWL user. E.g., when you started and/or finished the scheme, any difficulties you may have encountered during that time in relation to AWL attendance or completion, details of any positive physical or psychological changes linked to AWL involvement.

Note – The PEER role is to act as demonstrable evidence of the benefits that may stem from AWL completion and to effectively communicate these benefits to AWL users. However, PEERs are under no obligation to answer any questions or share personal information relating to their lives outside of the gym environment, e.g., Family life.

Example – As a PEER, you may be able to contribute towards AWL user motivation by helping to create a positive and enjoyable gym environment and providing details of your own AWL experiences. Accordingly, it would be appropriate to be positive and enthusiastic about the AWL experience and to communicate this effectively with AWL users. It would not be appropriate to attempt to encourage AWL users to perform any more, or less, exercise than which they feel comfortable with, or that has been agreed with the GP referral officer.

Case study one - *"I think sometimes it's easy to…give up…especially if you come and you have a bad day, or maybe you've gotten up and you don't feel that good, and you're going to the gym and you don't…when you get there, you don't feel like doing it…and, you know, if you can just talk to someone and…they bully you up. Because sometimes, it can be boring, it can be sometimes boring, but sometimes, if you've, if somebody's there to chat to you, the time goes quickly"*

Case study two - *"I could introduce the PEER going, Barry, this is Gloria, our PEER volunteer, Gloria completed the service 6-months ago, experienced great results and now she's here to motivate you to have the same results, so talk to you about her experiences, her goals, and how she attained them and see how that rubs off on to yourself'."*

Emotional

Description - Many AWL users remark feelings of nervousness and apprehension upon first entering the gym environment. As a PEER, it is your role to help to put new AWL clients at ease and to make their transition into the gym seem much less daunting. This process will typically involve introducing yourself to new members, identifying yourself as a PEER and instigating friendly conversation between yourself and the user. During this time, it is also expected for you to ingratiate new users to the scheme by introducing them to other AWL users. For more experienced AWL users, emotional support is expected to be provided by showing repeated interest in themselves and their well-being, for example, asking how clients how they are doing? How has there day been? etc.

Note – The PEER role is to provide emotional and social support to AWL users by ingratiating them to the scheme and fostering social interaction between themselves and other AWL users.

It is not within the capacity of the PEER role to act as a counsellor, or to question individuals about the underpinning reasons behind any potential emotional or psychological discomfort. For example, in the event of an AWL user choosing to share personal information about their private life or state of emotional well-being, it is not your responsibility to engage with topics of conversation in this regard. Further, if this does happen, **it is essential that do not share this information with others without the express permission of the AWL client to do so to protect client confidentiality.**

Example – As a PEER you are expected to provide initial and ongoing emotional support to AWL users by showing a general interest in their well-being and day-to-day activities and by offering advice and support. However, this role will be dutifully fulfilled by the provision of polite and courteous inquiring (i.e., by asking, 'how are you doing today?') rather than deep or extensive personal interrogation (i.e., by probing into the reasons why an individual may be feeling a particular way).

Case study one - *"…well, he walked in and erm…the GP referral officer said 'hello', and Dennis [AWL PEER] said, 'oh, he's new', and they introduced me, and this carry on and Dennis said, 'well, where've you been before?', and he just started a conversation up. And then, somebody else came in, and everybody knew him…and he was, I would say the lynchpin of it all"*

Case study two – *"Our PEER, Gloria, she's really outgoing, really bubbly, she's not frightened to talk to people, and she always lifts peoples' spirits a little bit as well, so, you know, if somebody's really nervous about coming in to a gym environment, they've never been to a gym in their life, she actually helps them feel more relaxed."*

Practical advice

Do

- Be friendly and approachable to all AWL users
- Be respectful of other AWL users and their reasons for referral
- Show an interest in AWL users and look to instigate social interaction
- Where possible, look to introduce and engage AWL users in conversation with each other
- Communicate the positive impact AWL may have had on your own health and well-being

- Contact your GP referral officer if you are unable to attend a designated PEER supervision time slot

Don't

- Ask direct personal questions to AWL users, such as, their reason for attending AWL. Instead respond to clients based on what they are willing to share
- Share with others, any personal information which an AWL user may share with you.
- Attempt to provide any specialist advice on how to use or operate gym equipment/equipment. That is the role of the trained GP referral officers
- Be overbearing or authoritarian with AWL clients. The PEER role is solely to provide support and guidance depending on the wants and needs of AWL users.
- Be scared to contact your GP referral officer if you have any questions or queries about your role and responsibilities.
- Expect all AWL clients to respond to you in the same way. Some individuals may appear to be more receptive to your help than others. This is perfectly acceptable and to be expected. The PEER role requires adaptability and flexibility when offering support to different clients in interpreting the type of support clients may want.

Declaration

By signing this declaration, you are confirming that you have;

Understand the role of a PEER volunteer, including what is and isn't' expected from you in the capacity of a PEER volunteer.

Received this guidance document and been presented with the opportunity to ask any further questions

Been made aware of the importance of ensuring client confidentiality and agree to not share personal details of any AWL client, without their express permission.

Name …….....…….....
Signature…….....……Date…….....

For GP referral Officer use only

Name of GP referral officer …….....…….....
Signature…….....……Date…….....

Thesis study map

Study	Objectives and Key Findings
Study One – Uptake and completion rates of AWL: Evidence from a self-referral friendly ERS	**Objectives** - Explore rates of AWL uptake and completion. - Explore demographic and referral characteristics of those who accessed AWL.
	Key Findings - Rates of AWL uptake and completion were consistent with previous ERSs despite the considerably greater prevalence of self-referrals. - Demographic patterning of AWL participation was comparable with previous ERSs.
Study Two – Physical, behavioural and well-being outcomes associated with AWL completion	**Objectives** - Investigate physical, behavioural and well-being outcomes associated with AWL completion. - Explore potential differences in physical, behavioural and well-being outcomes according to primary referral condition.
	Key Findings - AWL completion was associated with a variety of physical, behavioural and well-being-related improvements. - Participants varied considerably in terms of the magnitude of BMI reduction, blood pressure reduction and physical activity increase according to primary referral condition
Study Three – Facilitators and barriers to AWL completion: A needs analysis	**Objectives** - Explore perceived facilitators and barriers to AWL completion - Investigate factors that influence perceptions of facilitators and barriers
	Key Findings - Reported facilitators and barriers to AWL completion were consistent with previous ERS research. This included the perceived saliency of social support to ERS completion. - Expectations and experiences of social support differed among participants. - Perception of facilitators and barriers were significantly influenced by the extent of participants other (i.e., non-AWL) commitments and previous physical activity experience.
	Objectives

Study Four – Optimizing peer support in AWL: AWL client and stakeholder perspectives on peer recruitment and implementation	- Elicit AWL client and stakeholder perspectives to inform the development of a bespoke peer support intervention for AWL. - Explore perceptions of desirable demographic peer characteristics among AWL clients and stakeholders
	Key Findings
	- AWL clients de-emphasised the importance of demographic characteristics but highlighted peer positivity and empathy as essential personal characteristics. - Implementation of peer support within AWL was positively regarded as a means to increase provision of emotional, motivational and informational support to AWL clients - Peer acceptability was anticipated to be greatest among older AWL clients, therefore, peer implementation should be targeted according to when older clients accessed the scheme
Study Five - Acceptability of the AWL peer intervention: Evidence of promise and lessons for the future	**Objectives** - Explore initial acceptability findings from the AWL peer intervention from the perspectives of EROs, peers and clients. - Explore evidence of promise for the AWL peer intervention to foster shared social identity among AWL clients.
	Key Findings - -

Chapter 8: Acceptability of the AWL peer intervention: Evidence of promise and lessons for the future

Introduction

Social support is associated with better ERS engagement (Rahman et al., 2011; Moore et al., 2013; Hanson et al., 2019). ERS participants regularly highlight the importance of receiving social support (Hardcastle & Taylor, 2001: 2005; Vinson & Parker, 2012; Moore et al., 2013), and express dissatisfaction where social support is perceived to be lacking (Stathi et al., 2004; Wormald & Ingle, 2004; Hanson et al., 2019). Perceived accessibility of social support varies according to demographic (Moore et al., 2013) and personal (Hanson et al., 2019) characteristics, such as age, sex, and social anxiety. Moreover, as highlighted in chapter 6, ERS participants differ in their expectations and experiences in relation to the desirable source, frequency and form of social support. Taken collectively, these findings indicate that a one-size-fits all approach for providing social support is inappropriate within an ERS context. To date, there remains need to identify effective strategies to provide social support among ERS participants who are eager but currently unable to access it. Subsequently, the integration of structured peer support within ERSs presents an opportunity to provide greater social support to ERS clients, whilst preserving participant autonomy over if, when and/or how they choose to access it.

Peer-based interventions can yield positive health-related outcomes, such as increased PA (Hulteen et al., 2019) and well-being (Hardy, Hallet, & Chaplin, 2019). Identification, development, and promotion of contextually appropriate peer roles and establishing quality relationships between peers and intended recipients of peer support are distinctive hallmarks of effective peer-based interventions (Martin-Ginis et al., 2013; Matz-Costa et al., 2019). Perceptions of similarity between peers and recipients of peer support are critical to peer acceptability, and commonly achieved via the use of age and/or sex matching peer assignment strategies (Beauchamp et al., 2018; Owen et al., 2018). To date, there remains a lack of

evidence to document the development of a structured ERS peer-support intervention. This, in part, is due to the unique and demographically heterogenous context of ERSs relative to traditional group-based PA programmes. Within ERSs, a diverse assortment of individuals in respect of age, sex and reason(s) for referral undertake bespoke PA programmes tailored to their individualised needs and health-related goals (Rowley et al., 2019; Wade et al., 2020). Accordingly, commonly adopted age and/or sex matching peer assignment strategies are less appropriate in an ERS context, thus, potentially hindering the ability to establish positive relationships between ERS peers and clients.

Notwithstanding, whilst the prevalence of theoretically informed peer-based interventions is burgeoning (Hulteen et al., 2019), there remains a lack of evidence to document the development of peer-based interventions underpinned by a social identity approach. The social identity approach posits that an individual's behaviour is shaped as much by their social (i.e., 'us' and 'we') identities, as they are their personal ('I' and 'me') identity (Tajfel & Turner, 1979; Turner 1982; Turner et al., 1987). Adoption of a shared social identity is positively associated with the extent to which social support is offered, recognised and interpreted as desirable (Haslam, Reicher, & Levine, 2012). Where the source of social support is perceived by the intended recipient of support as belonging to the same social self-category, support will appear to be more forthcoming and interpreted as being helpful (Turner, 1982; Haslam et al., 2012). Thus, social identity underpins perceptions of both the receipt and absence of social support (Jetten et al., 2017; Kellezi et al., 2019; Bowe et al., 2020).

Critically, whereas the foundations of shared social identities can be based on demographic characteristics such as age and sex (Dunlop & Beauchamp, 2011; Beauchamp et al., 2018), demographic similarity is not fundamental to the adoption of social identity (Haslam

et al., 2012). Instead, the psychological basis upon which individuals self-categorize themselves occurs at varying degrees of inclusivity (Haslam et al., 2012). Accordingly, social identity-informed interventions focus on the identification and promotion of organic superordinate social identities (Halsam et al., 2017). For instance, rather than emphasising the ways in which ERS clients are different (e.g., age, sex, reason(s) for referral), the identification and promotion of ways in which they are similar can facilitate the development of shared social identity. As identified within chapter 7, the collective conceptualisation of AWL clients as individuals who are currently experiencing or rehabilitating from some sort of health-related condition presents a foundational platform to underpin the AWL peer-support intervention.

This chapter presents initial qualitative findings on the retrospective acceptability of the AWL peer support intervention described in chapter 7 (see appendix D for additional details of training and evaluation procedures of the peer intervention). As recommended by MRC guidance for complex interventions (Craig et al., 2008), analysing data from an initial piloting phase allows the identification and refinement of issues prior to implementation of a full intervention. Further, Hulteen et al. (2019) critique peer-based interventions for failing to adequately delineate specific peer-related actions that facilitate desired outcomes. Identification and understanding of such behaviours are critical to inform future peer recruitment and training practice and to further enhance the eventual effectiveness of peer-based interventions (Hulteen et al., 2019). Moreover, the development of a peer support intervention informed by the social identity approach is both novel and uniquely situated to guide peer implementation within an ERS context. Identification of foundational platforms for the adoption of shared social identity can promote greater acceptability of ERS peers.

This study sought to further explore how peer support could be utilized within ERS provision. Following piloting of the 12-week AWL peer support intervention, this chapter sought to identify: (1) the operationalisation of peers within the AWL context, (2) the fidelity in which peers performed their roles as intended, (3) prospective acceptability among clients, exercise referral officers (EROs), and peers, (4) practical considerations to inform future peer implementation, and (5) evidence of promise for the recognition and adoption of shared social identity within AWL.

Method

Context

Four currently active AWL completers were recruited, trained, and positioned as peer volunteers within supervised sessions across the Skelmersdale (n = 2) and Ormskirk (n = 2) AWL leisure sites in September 2019. An additional peer was recruited to the Ormskirk site in November 2019 to cover an extended peer absence (see chapter 7 for an in-depth description of the peer recruitment procedure). Peers were integrated within supervised ERS sessions under the guidance of designated EROs (n = 2). Each peer agreed to assist EROs for two 1-hour peer sessions per week for an initial 12-week period. Peers were specifically instructed to provide the following forms of support to ERS clients: (1) *Practical* – e.g., non-specialist assistance using exercise equipment, (2) *Informational* - e.g., general guidance on exercise and gym facilities, (3) *Motivational* – e.g., positive messaging, and (4) *Emotional* – e.g., helping clients to feel at ease within the exercise environment. Peers were explicitly informed not to attempt to provide any specialist advice on how to use or operate gym equipment. Peers wore an AWL-branded 'Peer volunteer' t-shirt during peer support sessions. Peers were incentivised via free access to the leisure site facilities for the duration of their time as a peer, as well as a free 6-month membership following the end of their involvement. Following completion of the initial 12-week period (Sept. – Dec. 2019), peers continued acting in the role on a provisional basis until AWL funding ended on 31st March 2020.

Participants

Participant eligibility comprised peers (n = 4), EROs involved in the recruitment and management of peers (n = 2) and current or recent AWL clients who received peer support (n = 5). Peer and client ages ranged from 44 to 67 years (58.8 ± 8.4 years) and 49 to 77 years (64.4 ± 10.76 years), respectively. Key demographic characteristics of peers and clients are

presented below (Table 8). EROs ages ranged from 42 to 49 years (45.5 ± 3.5 years) and all participants identified as White British.

Table 8. Key demographic characteristics of peers and clients

Pseudonym (ID number)	Site	Age (years)	Sex	Medical condition	BMI (kg/m^2)	Peer sessions attended† (%)
Peers						
Mabel (P1)	Ormskirk	67	F	Respiratory	28.7	73% (11/15)
Paul (P2)	Ormskirk	67	M	Parkinson's	29.4	93% (14/15)
Ricky (P3)	Skelmersdale	59	M	Diabetes	36.6	69% (11/16)
Carl* (P4)	Ormskirk	44	M	Mental Health	31.4	100% (5/5)
Meredith‡	Skelmersdale	57	F	Gastrointestinal	19.8	47% (8/17)
Clients						
Doris (C1)	Ormskirk	65	F	Musculoskeletal	32.6	N/Aˆ
Harry (C2)	Ormskirk	77	M	Cancer	26.4	N/Aˆ
Tegan (C3)	Skelmersdale	49	F	Mental Health	31.2	N/Aˆ
Jessica (C4)	Ormskirk	56	F	Cardiac	21.8	N/Aˆ
Agnes (C5)	Ormskirk	75	F	Cardiac	27.1	N/Aˆ

*Peer recruited in November 2019, †Sept. – Dec. 2019 sessions only, ‡Not interviewed, ˆClient attendance not recorded

Data collection

Data collection commenced between November 2019 and March 2020. EROs were asked to identify and recruit clients who received peer support at any stage of their AWL involvement before contacting the researcher to arrange an interview. Interview length for peers and clients ranged from 21 to 42 minutes (mean duration = 30 minutes) and 28 to 46 minutes (mean duration = 35 minutes), respectively. ERO interviews were 37- and 33-minutes duration., respectively. Interview guides encompassed peer roles and responsibilities, the implementation of peers within supervised sessions, as well as the retrospective acceptability of peers.

Data analysis

Using guidance set out by Braun and Clarke (2013), the data were analysed thematically (see methods section for full discussion of methods, chapter 3, p59 - 61).

Results

Three main themes are presented to convey preliminary qualitative findings from the AWL peer support intervention. The first theme sought to delineate how EROs utilized peers to support AWL provision. Additionally, sub-themes are presented to detail the roles peers performed and individual differences in peer approaches. The second theme focussed on retrospective peer acceptability among EROs, clients and peers. Participants discussed overall peer acceptability, as well as how peer roles and demographic and personal peer characteristics influenced perceptions of acceptability. The third theme centred on participant feedback for how the peer intervention could be enhanced. Participants provided feedback related to the timing of the intervention, factors influencing the development of positive peer-recipient relationships and proposed revisions to the peer training programme.

Utilising peers within AWL

This theme presents an overview of how peers were utilised by EROs within the AWL context, details common peer roles, and provides examples of individual peer approaches. Sigourney (ERO1) discussed how she introduced peers to new clients and socially integrated them within the AWL environment:

> I introduce the volunteers, explain what the volunteer role is to that person [client]. Get them to know each other. So, I would stay with the volunteer and that participant until they'd got a bit of a rapport going and then I'd go off and do things with other people that were in the gym.

Georgia (ERO2) adopted a similar practice: **"**I would introduce the volunteer [to a new client] immediately, possibly before I've even left this room [where initial assessment appointments took place], because the volunteer would already be around. And then just integrate them into chatting". Accordingly, EROs utilised peers as supplementary early sources

of general and social support for new clients. Mabel (Peer1) corroborated ERO accounts: "[The ERO] I'd say, has introduced everyone to me, and introduced me to them. When they first arrive, she'll always say, 'oh, have you met [Mabel]? She's one of our volunteers'". As did Jessica (C4):

> I think she [ERO] just introduced me and said if she wasn't there or she was with somebody else and they were there, to ask any questions, or help if she wasn't available or something like that perhaps. And then, you know, they started talking to me and stuff and, that was it.

After an initial introduction, Georgia (ERO2) described how she utilised peers in a manner that allowed her to focus on supporting new clients: "If I've got one in that's new and I've got a couple of others, my volunteer will then go over and work with the other people and support them". Similarly, Sigourney (ERO1) discussed designating peer support based on the severity of a client's medical condition: "I will sort of…if I know say that [client] is coming in, I will sort of allocate [peer] to him a little bit more. So, I can concentrate maybe on someone that's higher needs than what [client] is". Georgia (ERO2) recounted an experience where she had used peers in a similar capacity: "I had a time where I had a very high-needs client and I had to have them in here just for a little moment, and again, [the peer] just took over with the people that were out there".

Peer roles

Clients were asked to share their experiences of peer support during the supervised sessions. As explained by Harry (C2), peers commonly assisted clients in their use of exercise machines/apparatus: "If you can't set…set…set it up, they will always come and adjust and tell you. Because there is one machine that has got a button missing and it doesn't set always

on the right setting". Agnes (P5) described a similar instance of accessing peer support to aid with the use of an exercise machine:

> It's probably age-related, but these pin things, you know (laughs), I often think to myself, 'now, do I pull these ones in and keep these ones out? Or do I pull these ones out and keep these ones in?' So, things like that. So, erm…they're on hand then…you know, to…for me to just be able to shout over and say…'can you just remind me, which pins I need to pull' (laughs).

Ricky (P3) described an example where he had offered non-technical guidance to a client relating to the use of the exercise machines:

> I have this boiled kettle scenario. Across the top of the television screens it has your heartbeat … calories, heartbeat, time, blah-di-blah. Now I found over a period of time that I didn't like that, and then I turned around one day to [ERO] and I was just saying to him about it. He said, 'Well, yeah, turn it off'. So, I said to some of them [clients] now, 'Turn it off.' It's not like watching a kettle boil then. You can just sit and watch television. Try and get it into your [head] what you're doing, and just keep pressing it every now and then.

Unfortunately, there were isolated examples where peers appeared to recommend or encourage clients to try new exercise machines. Agnes (C5) positively described how a peer had been helpful in showing her how to navigate an unfamiliar piece of equipment:

> The second time I was here, erm…there was a…erm… [an exercise machine] at the end, the one where you have to put your hands back like this, and your elbows up like this. Well, I had not been on that, and I thought, 'oh, that looks quite good that'. You know. Erm…so, when [the peer]

was coming, and said to me, ‘oh, have you been on that’, and I said, ‘no, I haven’t’, so they came across and like, I went on that, and they made sure that I was doing it correct.

Sigourney (ERO1) acknowledged she had found peers to be engaging in similar behaviour: “At first, [the peer] was tending to try and teach people to use certain machines that I had not put them on”. However, it was explicitly emphasised in the training package that peers should not attempt to offer any form of prescriptive or technical advice related to the selection, technique or intensity of client’s exercise behaviour. Positively, Sigourney (ERO1) continued to describe that this behaviour had been successfully quashed: “We’ve addressed that all now, that’s all sorted. So, they do know not to do that, or up weights for people”.

Clients also discussed ways in which peers offered social support during their time on the scheme. Jessica (C4) talked about how peers immediately welcomed her upon arrival to the gym, before circling back around at a later point for a chat:

As soon as I came in he just said, ‘oh hi, are you ok?’ and stuff, and then I just went on the machine. And then normally he will come and talk to me later on, he usually comes to chat to me when he’s free.

Agnes (C5) recounted a similar experience:

As soon as I came in today and went on the treadmill, I think…I don’t know, is it [Mabel]…I get mixed up with the names because there’s so many of them, the lady volunteer we’ll say, erm…came right across and said, you know, ‘how was I doing’. You know, so that’s nice. That’s nice, yeah. Oh, they do interact very well, the volunteers. You know, they go around to the different people and just have a chat and make sure that everything’s going alright.

Peers and clients were asked to divulge common topics to arise during their social exchanges. Doris (C1) explained how the chats between her and peers encompassed a wide range of topics: "(Laughs) Anything. Yeah, anything. Anything that's…erm…in the modern day what's going on in the world. Political or the weather, or football, or rugby, or whatever. Television's on, yeah". Peers especially valued conversations that were not explicitly related to exercise or health and well-being:

> There's been a lot of topical stuff. Like the Friday was taken up with the … the Election was the day before, so there was a lot of talk about that. Yeah, people tell you about their interests, tell you about their plans. Yeah. No, it's a really good mix of … it's not all about, it's definitely not all about the gym and about the exercise (Carl: P4)

> When they're not sitting talking about gym, gym, gym, I think I'm doing a decent job. Like … one lady the other day who was in, she said, 'What did you think of the final, did you think it was all right?' And that was the first thing she said to me. Didn't even say, 'Hello, [Ricky]' or anything. 'Did you watch the final?' and that was 'I'm a Celebrity, Get Me Out of Here. (Ricky: P3)

Ricky (P3) went on to explain how these social exchanges could then segue into discussion of client's health and well-being: "And she's there pedalling away, you know. 'Did you watch the final? Oh, yeah, [what] did you think …? Oh, yeah.' And, you now, sit down and, 'How are you doing? How's it feeling, how's … is it good?".

Individual peer approaches

Within discussions relating to the content of social support it became apparent how the diverging personal and professional backgrounds of peers shaped their approach to the role. Sigourney (ERO1) discussed the different approaches adopted by the peers under her management:

> [Carl] is really good on the mental health side of it. Because he knows…because he's going through that himself, he knows how to sort of approach it, probably in a better way than me, to be honest with you. He's probably really good at that. [Mabel]'s more the have a giggly type one, so if you've got somebody who's a bit quieter, pulling them out of that background. [Paul]'s more reserved but he is good at being able to sort of encourage people that are lacking in confidence. So, he'd say, 'oh, when I started, I was x, y and z and now I'm like, you know I've lost weight, I've done this, I've done that'. So, I think [Paul] is a good sort of motivator in that sense of 'look what I've achieved'.

Similarly, Georgia (ERO2) discussed subtler interpersonal differences between peers. After light-heartedly referencing how peers "certainly knew how to talk", she went on to describe how peers' conversational styles differed: "It's just, they've got different personas, you know. One's an Irish lady who can make everyone giggle and [Ricky]'s more kind of statistics and general chit-chat". Overall, these differences were reflected in the approaches of peer's themselves. Peers were divided in their apparent comfort when engaging new clients. Mabel (P1) described her initial conservative approach: "I'm a bit of a people watcher. Just watch, 'do they need help? Does it look like they want to have a chat?'. I don't go in full on" and say, 'who are you?', and, you know, anything like that". In contrast, Ricky (P3) was much more forthcoming: "I come in here with the lad, swimming [when not acting as a peer], and as people'll walk out, 'Oh, [Ricky]', and they know me, and it's through me pushing my face

here, there and everywhere. I'm great at pushing my face in things". Ricky's (P3) professional background as a taxi driver belied his ability to socially engage clients: "My way of talking to people when they're in a taxi doesn't differ a great deal to the way I talk to people in the gym, but I wouldn't start talking about my medical conditions to people in my taxi!". Alternatively, Paul (P2), a retired psychiatric nurse, described how his prior professional experiences imbued his own approach to the role, also believing clients to be more receptive to his support after sharing details of his professional background with clients:

> Once they get to know me and they seem more relaxed. They tend to talk about why they're here. What…people talk about their health conditions, as well. Because I let them know that I'm an ex-nurse. And I think that helps, as well. Because they can tell me things that they might not be able to tell other people.

The provided peer recruitment guidelines focussed on identifying individuals who fitted a particular demographic and personality profile. However, peers were sometimes able to utilise suitable aspects of their own personal and professional experiences to successfully engage clients in subtlety different ways.

The benefits of peer support

Georgia (ERO2) praised the supportive nature of peers: "They've [peers] been very enthusiastic and very supportive and able to … kind of reach out to our new customers, which has been quite nice". Sigourney (ERO1) considered clients to be receptive to peers, recounting examples where clients would ask about the whereabouts of peers if they were not in sessions: "When they've come in and they've missed [Carl] by 5 minutes or whatever, it's they've actually been asking like, 'where is he?'". Clients, like Doris (C1), echoed these sentiments, like Doris (C1): "I think they've [peers] helped us and made us, you know, feel ok". As

somebody who had never attended a gym before, Jessica (C4) believed the peers had helped her feel more comfortable:

> It's nice that they are so friendly and welcoming because it is a bit intimidating sometimes, isn't it, going to a gym. So, it is nice when you walk in and someone says…and they know your name as well and they just go…you know, you kind of feel like you should be there.

Peers themselves perceived their role to be beneficial to clients, often recounting anecdotal or observational evidence to support this view. As expressed by Paul (P2): "They've [clients] said that they've enjoyed the sessions that they've attended. It's been beneficial to them to have somebody to show them what to do". Carl (P4) referenced the openness in which clients appeared to engage with him: "Very sociable, very upbeat, very open. Yeah, they're a pleasure to be around and interact with. Yeah, really interesting, to be honest. Everyone's got their own story, and they're … yeah, people are very forthcoming". Similarly, Mabel (P1) recounted an experience where a client shared 'surprising' personal information with her:

> I just went over to him and said, 'oh, I believe you're a bit of a golfer'. You know, and I do know a bit because my family play it. And then he started telling me about his op. And then I was speaking to his wife, later on. And I said, 'oh, he said he hadn't been so good', and she said, 'oh, I'm so shocked that he's told you that. It's supposed to be in the family. He's not supposed to tell anybody that' (laughs). But she meant it in a nice way, that he'd actually spoke about it.

These experiences were central to peer's own sense of fulfilment for the role. As articulated by Ricky (P3): "I enjoy doing it, I get pleasure out of it, and if I'm passing a little bit on to somebody else … even if it's only a little bit … it's better than nothing at all", and Mabel (P1): "It just makes you feel good when you think you can help somebody. And I'm lucky…that, at the minute I'm not in a position…I appreciate what I've got and I… I just like

to help people and see them improve". Moreover, Carl (P4) described the pre-eminent value he placed on acting as a peer, rearranging his schedule, where possible, in order to be able to attend peer sessions: "When I can rearrange things, and that, I say … this is like top of my list, because I enjoy it. Something else can be moved. I'll put this first". This stance was reiterated by Ricky (P3), who explained how he often unknowingly went over his expected commitment of one hour per session: "I know [the ERO] starts her day at 12:00 [pm]. So, 12:00 till 2:00, but you come in, you don't just do an hour here. I'm sometimes here for an hour and a half. I've looked, 'Oh, shit, I've got to go".

EROs and clients cited the central importance of peers being able to act as an "extra pair of eyes". As highlighted by Georgia (ERO2): "If I've got a group of people in, it's nice to have someone else having your back and being able to keep an eye, otherwise you're just running around like a blue-arsed fly", and Sigourney (ERO1):

> It just makes life so much easier that, if I'm with somebody who's…either on an induction or they're brand new to the gym and I've got to spend a bit more time helping them, I can just ask whatever volunteer's in on the day to keep an eye on a certain person if they're a bit wobbly.

Jessica (C4) drew from personal experience of busy periods within the gym to contextualise the perceived benefits of peers: "And, [ERO]'s always there but sometimes she's with someone or she'd doing an induction or something where she's showing someone something, so it's always good to have somebody else on hand who is always there, just to show you stuff". Agnes (C5) provided details of a similar experience: "I think, because if you can't find [ERO], the volunteers are usually there and you just have to shout, you know, and they'll come across and help you with whatever you need to do". Notwithstanding, acceptability and peer engagement differed in some cases related to the demographic

characteristics of peers. Some, like Doris (C1), expressed preference for a younger and/or female peer: “I’m more in tune with the younger ones. Erm…and possibly female, as well”. Tegan (C3) also reported a preference for a female peer due to a recent negative personal experience:

> Well, me in particular, would feel better speaking to a female. Especially after what’s happened to me a couple of weeks ago. So, that’s where I am at the moment. But there’s nothing wrong with male volunteers. That’s what I feel comfortable [with] at the moment because of what I’ve been through the last couple of weeks.

Jessica (C4) discussed her positive experience interacting with a peer of a similar age: “I’d say he probably is, ish, my age group. But I wouldn’t like to comment (laughs). So, that’s probably why I can relate to him better because he’s not old and he’s not young, he is kind of my age”. Sigourney (ERO1) recounted an instance where a peer and client bonded over a shared medical condition: “They got talking and they found out that they had similar conditions. So, that was actually quite good because [Paul] was actually explaining to this gentleman about how he…what he’d done and how it had helped him”. Similarly, Ricky (P3) detailed how he had personally benefitted from discussing details of his medical background with a client on the scheme:

> I said, ‘I’m a diabetic, I’m a Type-II diabetes, and I’ve suffered with multiple blood-clots’. And then, they’ll say to me, ‘Oh, do you take warfarin?’ ‘Yeah, yeah, I take warfarin.’ One lady has actually said to me, ‘Go to your doctor.’ She did say to me, she did write it down, I’ve put it somewhere in [there] … ‘Go and ask about …’ a completely different drug. Now, that’s come off one of the ladies here.

Practical considerations and lessons for the future

Participants highlighted modest and variable client attendance of peer sessions. Carl's (P4) peer sessions had the best attendance: "I'd say it probably averages … at any one time, I'd say between seven and nine, as a guesstimate", though attendance varied around 3 – 6 clients among other peer sessions. Jessica (C4) described a notable occasion when attendance was particularly low: "There's probably 4 or 5 people [in the sessions], I mean, when I came on Thursday there was literally me and one other person, and then they went and there was just me (laughs)". Ricky (P3) attributed this to seasonal variation:

> I did mention this once to [ERO], I said, 'Wouldn't it have been …' I've got to be careful how I said this on your Dictaphone … 'would it be more in your interest to … probably introducing this in spring, so you'd be going through the summer months?' Because when I used to come in in summer months, it was busy.

Georgia (ERO1) also referenced the negative impact of winter on attendance: "Normally, my Tuesday and my Friday are pretty booked up, but since the middle of November hit, it's just gone right quiet". Moreover, Sigourney (ERO1) believed the drop-in nature of supervised sessions contributed to the variable and unpredictable attendance, highlighting the difficulty of trying to ensure peers were implemented within the busiest sessions: "Monday morning was manic and I didn't have any volunteers in because the volunteer usually comes in on a Monday afternoon, but the afternoon session was a lot quieter because a lot of them had come in in the morning". Nonetheless, peer attendance remained generally consistent. Peers cited deterioration of health related to their medical condition(s) as the primary contributing factor for any nonattendance. As explained by Paul (P2):

> The only time I don't come in is when my Parkinson's is really bad. And I know I'm not going to be able to speak particularly well because the brain and the mouth don't work sometimes. Erm…which can be a bit embarrassing for me and I don't want to put my embarrassment onto other people.

Carl (P4) recounted an experience when he had informed the ERO that he would be unable to attend, praising the EROs understanding: "I had to miss a week of volunteering due to an ongoing health problem [the ERO]'s aware of. She was fantastic about that". Sadly, one peer stepped back from their role for an extended period of time due to the unexpected loss of a member of their immediate family. Owing to the sensitive and unpredictable nature in respect of if, or when, the peer may wish to return, EROs were asked to try and identify another prospective peer to cover these sessions, though no suitable replacement could be found. Unfortunately, this meant despite a positive early experience, Tegan (C3) did not receive continued peer support throughout her involvement with AWL: "I haven't seen anyone for ages. Because I thought they'd all been, like told not to come or something. because I haven't seen anyone. The only person I've seen is [the ERO]". There was a comparable, but distinct, occurrence within the Ormskirk site where a peer similarly indicated that they would be absent from peer sessions for an extended period of time. However, in this instance, a suitable replacement peer was quickly identified and recruited, as alluded to by Sigourney (ERO1): The only really one's [peer absence] where like [Mabel] for the first week when she was away. But then we got [Carl] in so it's not really had much effect".

Participants also highlighted a lack of clarity in relation to the specific roles and responsibilities of peers, as well as their professional backgrounds and expertise. Agnes (C5) acknowledged that peers had completed AWL themselves prior to assuming the peer role and expressed how this brought her comfort: "Obviously, she [the peer] knows…if I'm just starting

out, she kind of knows what, you know, I'm going through. So, it's just kind of making you feel comfortable". However, Tegan (C3) was unsure whether peers had sufficient experience and knowledge to positively enhance her experience:

> I don't know what training, if they've been trained. I don't know. I was just introduced to a volunteer. And then she [peer] said that she used to be on the scheme. So, I thought to myself that she only knows, what I'm going to know after 12 weeks.

Doris (C1) expressed similar uncertainty regarding peer's backgrounds when asked whether peers were suitable for their roles:

> Yes. Because I understand that they've been there in front of us. I think they're doing what they've experienced, like we are. And, they've had promotion to do the job they're doing. I think. That's right isn't it? We might know more than them.

Mabel (P1) expressed a lack of confidence when describing an interaction where a client had asked them what their role consisted of as a peer: "I do say, I'm just here to talk to people. To make them feel comfortable and for them to want to come back and use the gym. That is, isn't it? There isn't anything else I should be doing?". Peer responses belied a lack of clarity surrounding the parameters of the peer role when asked to discuss the adequacy of the training they had received. Mabel (P1) believed the training to be sufficient, though inferred that she would feel more confident with enhanced knowledge of how some of the exercise machines worked: "I don't know how all the machines work…but then again, I don't think that's my role is it? Mine is just to support people and make them happy and want to come in and I think that you did that". Carl (P4) indicated he would benefit from designated first aid and safety training: "I suppose the only thing that concerns me a little bit is whether there

should be some sort of kind of first-aid induction. Or maybe a little bit more about the building: fire-escapes and things". Though, Ricky's (P3) interpretation of the peer role was closer aligned with how it was intended:

> The role you're asking of me is not … it's not a severely demanding role. It's not something where … there's no more amount … you know, what other amount of training can you give me? Can you give me the fact that I might end up working in the same capacity as [the ERO]? I don't think that would be any beneficial to me, it wouldn't be any beneficial to you.

Moving forward, Sigourney (ERO1) suggested a more structured training approach involving all of the prospective peers together would collectively improve standardisation and comprehension of peer roles: "Yeah, more structure to it. Rather it just sort of be left as an individual thing. I think it could do with more of a group. I think that's how we would end up with a better volunteer scheme". She continued to suggest this should be inclusive of different sites: "Rather than it being at [our site] we do this, at [other sites] we do that. I think it needs an actual overall umbrella-ed training package (sic)".

Discussion

AWL clients, EROs and peers discussed their experiences of the AWL peer support intervention. EROs and peers delineated the operationalisation of peer support within AWL, as well as individual approaches adopted by peers themselves. EROs assigned peers to clients with perceived 'lesser need' for support so they could prioritise their attention towards newer clients or those with 'higher need' for support. Subtle peer differences linked to personal characteristics and professional experiences belied different peer approaches and communication styles. Overall, all stakeholders indicated good peer acceptability. EROs and clients valued peers as a means to reduce the burden on EROs and as readily available sources of proxy social support. Peers themselves discussed how the role provided a personal sense of fulfilment and satisfaction, though, client perceptions of acceptability varied according to perceived similarity of peer sex and age. Primarily, peers consistently attended scheduled peer sessions, however, peer sessions had modest and variable client attendance. EROs and peers attributed this to seasonal variation, recommending future peer support interventions to be scheduled earlier in the year during spring or summer. A lack of clarity existed among peers and clients regarding the nature and extent of peer knowledge and expertise. Subsequently, future peer support ERS interventions can benefit from greater transparency and explication of peer roles.

EROs introduced new clients to peers at the earliest possible opportunity. Following this, EROs utilized peers appropriate to the perceived needs of clients in the gym during peer sessions. Severity of health condition(s) and stage of scheme influenced perception of need. Thus, EROs typically focused their attention on clients with complex health conditions or those new to the scheme and deployed peers to support others. Peers primarily offered support via non-technical guidance on how to operate exercise equipment and social support. Peers also

offered experiential advice for how to use exercise equipment in ways designed to stimulate engagement and manipulate the experience of time. The ability to disseminate experiential knowledge is a fundamental appeal of peer support interventions and repeatedly cited as a facilitator of participant engagement (Callon et al., 2013; Lorthios-Guilledriot, Richard, & Filatrault, 2019). Subsequently, peer advice included covering up the timer with a towel, use of a pre-programmed workout, or instructional guidance for how to access the in-built television. In rare instances, peers offered technical guidance on the use of exercise equipment, such as which machines to use or how to use certain equipment. However, EROs quickly identified and rectified such undesirable behaviour. Clearly defined peer role boundaries are critical to the success of peer support interventions (Dykes, 2005; Kennedy, Milton & Bundred, 2008), and frequently cited as vitally important among professionals tasked with supervising peers (South et al., 2011). Positively, the ERO described this as an isolated incident which received swift resolution. In all cases, peer social support primarily consisted of extending warm welcomes upon client entry to the gym and cycling around the gym environment intermittently during sessions to check clients were content. Evidenced by ERO and peer interviews, peers varied in relation to their interpersonal skills and confidence approaching clients. These characteristics fall within a broader range of peer professional backgrounds, experiences, personality and illness characteristics that have been identified with peer support successes (Holman et al., 2019). Lack of confidence, or shyness of peers can be detrimental to peer implementation success (Holman et al., 2019), relative to peers who are considered to be warm, energetic and humorous (Lorthios-Guilledroit, Filiatrault, & Richard, 2018). Lorthios-Guilledroit et al. (2018) found peers with extensive prior experience of facilitating group discussions were more confident and self-efficacious in their ability to utilise these skills during peer-initiated group discussions. This finding is in parallel to the current study, where peers with professional backgrounds associated with high-level interpersonal skills (e.g., taxi-

driving), were more confident in their ability to approach and engage new clients. Notwithstanding, as in Holman et al. (2019), AWL peers appeared to have skills in different areas, which influenced their individual approaches. Intriguingly, EROs highlighted subtle differences between peers, emphasising individual strengths of different peers. Thus, whilst the AWL peer support intervention originally sought to create a prescriptive template to guide peer recruitment, the findings of this study suggest there may be advantages of employing peers with varying approaches and communication styles. Specifically, whilst the peer recruitment template emphasized the critical importance of peer empathy and humour, being able to draw on a selection of peers who are able to demonstrate these personal characteristics in different ways is likely to be beneficial. This is especially true in the heterogenous context of exercise referral, where client perception may vary significantly in regard to whether a peer is considered confident and engaging, or as overpowering. Peers considered to be overbearing are comparably problematic within peer support interventions (Holman et al., 2019), reiterating the need for balance and high-level interpersonal skills of ERS peers.

Clients were acceptable to the peer role, citing the presence of peers as making them feel more comfortable. Effective peers are those who are able engage with clients on an equal footing through shared appreciation of each other's challenges (MacLellan et al., 2015). Thus, the recruitment and implementation of AWL peers who were managing health conditions provided a platform for relatability and enabled peers to serve as positive role models (MacKean et al., 2012). Peer's own experiences of health conditions distinguished them from EROs, promoting recognition of peers as 'normal people' who clients were able to talk to on an equitable basis (South et al., 2011; Lorthios-Guilledroit et al., 2018). Accordingly, client discussions with EROs were typically briefer and focussed on receiving technical or health-related guidance. In contrast, interactions with peers were focussed on client general well-being

and covered a variety of non-expert topics such as the weather, current political events and television. One peer described this as 'bringing the living room into the gym', an approach that is likely to have facilitated the positive perceptions of comfort referenced by clients. The ability for AWL peers to contribute to enhanced perceptions of comfort represents a meaningful, positive consequence of their implementation. As identified by South et al. (2012), being made to feel comfortable is a key enabling factor for participant adherence in peer support health-promotion initiatives. Given the pervasive and longstanding issues associated with ERS dropout (Pavey et al., 2011; Campbell et al., 2015), the implementation of peers within ERS presents a promising strategy to improve rates of ERS completion and warrants further exploration. Notwithstanding, some clients did express preference for peers of the same age and/or sex as themselves. Age and/or sex have been evidenced to influence peer-recipient relationships (MacKean et al., 2012), though the importance of shared peer demographic characteristics may vary among clients (Holman et al., 2019). AWL clients and peers recounted particularly positive experiences stemming from shared health conditions. Even where exact health conditions did not match, peers and participants were able to bond over the use of a similar blood-thinning medication (i.e., warfarin), that is widely used to alleviate a wide range of health conditions. Shared demographic characteristics further enhance perceptions of comfort and shared understanding, thus promoting peer acceptability (MacKean et al., 2012). Consequently, where possible, it is advisable for ERSs to recruit peers who vary in regard to sex, age (within the range of 45 – 70 years), and health condition. In doing so, EROs will be able to assign peers to clients that are demographically comparable, whilst simultaneously and alternatively providing clients with autonomy over which peers they perceive to be most similar to themselves.

Both clients and EROs cited the benefits of peers acting to support the role of EROs. Peers are able to bring fresh insight and enthusiasm to existing health promotion initiatives that contributes towards the creation of fun and engaging exercise environments (Gillard et al., 2013). Moreover, peers present a means to enhance the volume of perceived social support available to clients in a manner that surpassed that which could be offered via EROs alone. Accordingly, the presence of AWL peers enhanced perceptions of support, thus minimising the likelihood of client dissatisfaction with available levels of support. This is another promising finding given the greater ERS dropout risk associated with inadequate social support (Stathi et al., 2004; Wormald & Ingle, 2004; Hanson et al., 2019). Consistent with findings from previous peer support health initiatives (Stevens, Barlow, & Iliffe, 2015), AWL peers presented an affordable means to enhance perceptions of support relative to the implementation of additional, trained EROs.

Positively, peers themselves described the role as being fulfilling and satisfying. The findings appeared to be broadly consistent with the internal benefits often cited by peers, such as, increased self-esteem, confidence and self-efficacy (Barker et al., 2018). In line with MacKean and colleagues (2012), AWL peers valued the role as an opportunity to 'give something back', by sharing experiential knowledge with clients. Further, whilst sharing of such knowledge has the evident potential to be beneficial to clients, it also represents additional progression among peers on their journey from someone that is currently managing an existing health condition. Through sharing experiential knowledge, peers are able to reinterpret a negative life experience (i.e., the emergence of a health condition), into a positive life experience by sharing details of their story which may ultimately benefit others in similar situations (MacLellan et al., 2015). Similar to Stevens et al. (2015), the opportunity for peers to witness client progress and to be seemingly appreciated for their support appeared to be a

fundamental factor for long-term peer engagement. Though, it is not possible to establish causality in relation to whether these benefits were a consequence of the peer role or whether they were pre-existing qualities that positioned peers as being more likely to volunteer for such roles in the first place. Notwithstanding, the development and implementation of the AWL peer intervention enabled peers to experience such benefits, as well as various other benefits to psychological, social and physical well-being (Stathi et al., 2020). Moreover, positive peer accounts indicate acceptable pitching of the peer role with regards to expected short and long-term peer commitment, and level of peer responsibility.

Participants described modest and variable client attendance of peer supervised sessions, typically around 5-6 clients per peer session. Occasionally, the 'drop-in' nature of sessions prohibited the ability to schedule peers to attend the busiest supervised sessions. This resulted in an ERO detailing an instance where they had to manage an unexpectedly busy session without peer support. The 'drop-in' nature of sessions left AWL susceptible to these occurrences. Subsequently, whilst peers represent a cost-effective source of additional social support, the efficiency and cost-effectiveness of their implementation may be enhanced via more restrictive scheduling of available ERS sessions. That is, reducing the availability of 'drop-in' sessions to ensure clients are attending sessions in which peers are present. Peers described instances where they attended sessions with few clients. It is likely that repeated occurrence of poorly attended sessions may be detrimental to ongoing peer engagement and motivation. Peer attendance remained generally high throughout, with absences primarily explained by temporary deterioration of peer health. Unsurprisingly, this a consistent finding among peer support literature within the health domain (Small et al., 2012; Newland & Treloar, 2013; Lorthios-Guilledriot et al., 2019). Thus, this study reinforces Holman and colleagues (2019) advice to recruit a sufficient number of peers to cover short-term absences.

Notwithstanding, there were contextual factors, such as a lack of resources for incentives, preventing recruitment of greater numbers of AWL peers prior to implementation. Subsequently, there arose a need to recruit additional peers to both the Ormskirk and Skelmersdale leisure sites during the intervention period. Though an easy and expedient process for the Ormskirk site, recruitment of a suitable replacement peer proved challenging, and ultimately fruitless, for the Skelmersdale site. The identification of suitable peers can be difficult in any case (Catalano et al., 2010). However, given the disparity in socioeconomic deprivation between sites, it is not clear to what extent this may be attributed to the considerably greater deprivation of Skelmersdale and the associated reduced likelihood of volunteering among those from disadvantaged areas (Southby & South, 2016). The following interrelated factors may have presented additional challenges to the recruitment of a replacement peer in Skelmersdale: (1) the requirement for peers to have completed AWL, (2) the preference to recruit peers who had completed AWL recently, and (3) the low rates of AWL completion resulting in a reduced pool of prospective peers to choose from. Given the heterogenous nature in which different ERSs may vary in content and design, it is implausible to provide recommendations for an optimal peer recruitment number. Nonetheless, it is recommended that suitable peers are informally recruited as backups as and when they complete schemes to expediate their integration as 'full peers' as required, reducing the likelihood of long-term disruptions to peer support provision.

Clients and peers highlighted the need for greater clarification of the peer role. Clear delineation of peer roles is critical to ensure appropriate comprehension among peers and clients (MacLellan et al., 2015). Subsequently, peers are able to have confidence in the roles that are expected of them (MacLellan et al., 2015), and clients will be able to fully utilize all aspects of peer support. However, despite AWL peers undergoing standardised training prior

to their implementation, variable interpretations of the peer role existed. In line with Gillard et al. (2013), whilst the training protocols utilised within the current study were pragmatic, it is apparent that they failed to sufficiently facilitate shared expectations of the peer role. The consequences of such have been discussed earlier, where some peers attempted to offer technical guidance on exercise machine use. As proposed by an ERO, a greater consensus of peer roles may be achieved by group peer training that incorporates peers from both leisure site locations. This may promote greater standardisation between and within sites and allow successful strategies to be shared among peers (Holman et al., 2019). Alas, there also appears need to more clearly outline the nature and scope of peer roles among AWL clients. The AWL peer support intervention sought to promote equitable peer-client relationships to facilitate perceptions of sameness and promote the adoption of social identity. The conceptualisation of peers as sharing 'sameness' with the intended recipients of peer support is critical to their effectiveness (Springett et al., 2007), and attempts to elevate peer status above clients via enhanced technical knowledge or expertise is likely to have been met with resistance (South et al., 2011). However, some AWL clients appeared to undervalue the roles of peers if they interpreted peers as 'only knowing what I'll know when I finish the scheme'. Thus, providing greater description of peer roles and the intended value of peers among new AWL clients may further enhance their acceptability.

The following section documents the theoretical underpinnings of the AWL peer intervention from a social identity perspective. Specifically, this section critically appraises evidence of promise for AWL peers to contribute towards the adoption of a shared social identity among AWL clients. Promisingly, peers were often referenced as enhancing perceptions of comfort among AWL clients. Peers provided friendly welcomes to the gym and remembered client names. In addition, clients were forthcoming in their interactions with peers,

receptive to their advice, and inquisitive about their whereabouts when peers were absent. The provision of social support enables clients to feel comforted, understood and motivated, whilst reducing feelings of anxiety and isolation (Kellezi et al., 2019). Exercise group leaders can facilitate perceptions of comfort by fostering a sense of community and togetherness among exercise group members (Kellezi et al., 2019; Steffens et al., 2019). As identified by Steffens and colleagues (2019), comfort is positively associated with social identification and a sense of belonginess within exercise groups. This, in turn, is positively associated with more frequent attendance of exercise sessions, as well as greater physical exertion during sessions (Kellezi et al., 2019). Accordingly, AWL peers' ability to foster enhanced client comfort presents preliminary evidence of their ability to promote shared social identity. As outlined by Haslam et al. (2012), shared social identity is intrinsically associated with the perception and interpretation of social support. Thus, if peers and clients did not share social identity, clients would have been less receptive to peer support and more likely to interpret peer guidance as being unhelpful (Haslam et al., 2012; Jetten et al., 2017). Besides direct peer support, clients also discussed how 'just having peers there' provided feelings of reassurance. In line with Bowe and colleagues (2020), the presence of peers facilitated enhanced perceptions of social support and safety. Feeling adequately supported and safe are prerequisites for clients to feel confident enough to attend future exercise sessions independently and reach out to other social groups (Kellezi et al., 2019). Significantly, initial anxiety of entering an unfamiliar exercise environment is cited as a primary reason for ERS non-uptake and dropout (Morgan et al., 2016). Underpinned by a social identity approach, the AWL peer intervention presents a promising interpersonal relations strategy to facilitate ERS client assimilation to schemes and mitigate dropout risk.

Peers fully embraced the role, deriving pleasure form being able to offer clients experiential knowledge and witnessing client progress. Peers spoke of prioritising the peer role over other commitments and voluntarily staying beyond the lapse of their allocated session times. From a social identity perspective, the pleasure derived from witnessing client progress is rooted in peer's community identity (Bowe et al., 2020). Taking advantage of an opportunity to 'give something back' to the community is a fundamental peer motive (Bowe et al., 2020). Without the peers' strong sense of community identity (i.e., by seeing fellow scheme members as similar rather than distinct from themselves), the capability to derive pleasure from other's achievements is diminished (Haslam et al., 2012). Further, shared identity in this regard is the foundational basis for reciprocal helping among peers and AWL clients (Wakefield et al., 2011). Participants exhibited reciprocal helping in the current study via recommendations to contact GPs to explore potential alternative medication. Here, a client had experienced positive health benefits they attributed to a change in medication and sought to pass this feedback on to the peer in hope that they may accrue similar benefits. Ultimately, peers' intrinsic sense of community identity is likely to have been present prior to their involvement as a peer (Bowe et al., 2020), rather than developed or instilled as a consequence of AWL peer training. Thus, this may reflect a positive consequence of the in-depth consideration given to the development of the peer role and the peer recruitment strategy. EROs were heavily involved within the recruitment process and recommended peers on the basis of their previous interactions and assessments of character. Accordingly, this resulted in EROs proposing peers who had warm and empathetic personalities and altruistic motives for the role, such as a desire to help others.

Notwithstanding, some clients indicated preference for peers of similar age and/or sex as themselves. This is not uncommon within peer-based literature (Holman et al., 2019), nor is it uncommon from the perspective of a social identity approach (Beauchamp et al., 2018).

Demographic characteristics, such as age and sex, are overt, rudimentary sources to influence perception of sameness, and thus, facilitate the adoption of shared social identity. However, they are not fundamental to the adoption of shared social identity (Haslam et al., 2012). Subsequently, there were also successful examples of peers engaging and supporting clients of different ages, sexs and health conditions. Thus, within a heterogenous context such as ERSs where age and/or same sex matching of peers and clients may not be possible, this study presents preliminary evidence that successful peers can overcome these differences to provide valued support. This finding points to the four central aspects of a social identity leadership approach (Steffens et al., 2014): prototypicality, identity advancement, identity entrepreneurship and identity impressarioship. Of these, prototypicality refers to the extent to which leaders (i.e., peers) embody core group ideals, and is most aligned with perceived similarity in demographic and personal characteristics (Steffens et al., 2014). However, prototypicality can also be achieved via consistent demonstration of group salient behaviour. Identity entrepreneurship also involves leaders (i.e., peers) developing their own prototypicality by defining values, norms and ideals that give a shared meaning for group members (Steffens et al., 2014). AWL peers who developed positive relationships with a wide range of AWL clients are more likely to have had success promoting shared social identity via the recognition and proliferation of the ideal that all AWL clients share similarity on a fundamental level. That is, AWL clients had all experienced, or were currently experiencing a health condition(s) and accessing AWL as a vehicle to aid their recovery. Consequently, this study provides preliminary evidence that peers differed in their ability to foster and develop a shared sense of identity among AWL clients. Subsequently, implementation of ERS peers who are able to utilise all aspects of social identity leadership behaviour are most likely to foster the development of shared social identity within an ERS context.

Conclusion

This study presents prospective acceptability findings from the AWL peer support pilot intervention. EROs, clients, and peers were highly receptive to the integration of peers within the existing scheme structure. Thus, this study demonstrates that contextually appropriate, acceptable peer-based interventions can be developed and implemented within ERSs. Moreover, findings were reinterpreted through the lens of a social identity approach to explore evidence of promise for peers to facilitate shared social identity within an ERS context. Application of the social identity approach aided conceptual understanding of why peers were, or were not, able to positively influence clients' AWL experiences. Recommendations are provided to guide peer recruitment and creation of appropriate and valued roles for ERS peers. Embedding future ERS interventions within the social identity approach provides a fruitful opportunity to further understanding for how to develop and implement effective peer-based interventions.

Thesis study map

Study	Objectives and Key Findings
Study One – Uptake and completion rates of AWL: Evidence from a self-referral friendly ERS	**Objectives** - Explore rates of AWL uptake and completion. - Explore demographic and referral characteristics of those who accessed AWL.
	Key Findings - Rates of AWL uptake and completion were consistent with previous ERSs despite the considerably greater prevalence of self-referrals. - Demographic patterning of AWL participation was comparable with previous ERSs.
Study Two – Physical, behavioural and well-being outcomes associated with AWL completion	**Objectives** - Investigate physical, behavioural and well-being outcomes associated with AWL completion. - Explore potential differences in physical, behavioural and well-being outcomes according to primary referral condition.
	Key Findings - AWL completion was associated with a variety of physical, behavioural and well-being-related improvements. - Participants varied considerably in terms of the magnitude of BMI reduction, blood pressure reduction and physical activity increase according to primary referral condition
Study Three – Facilitators and barriers to AWL completion: A needs analysis	**Objectives** - Explore perceived facilitators and barriers to AWL completion - Investigate factors that influence perceptions of facilitators and barriers
	Key Findings - Reported facilitators and barriers to AWL completion were consistent with previous ERS research. This included the perceived saliency of social support to ERS completion. - Expectations and experiences of social support differed among participants. - Perception of facilitators and barriers were significantly influenced by the extent of participants other (i.e., non-AWL)

	commitments and previous physical activity experience.
Study Four – Optimizing peer support in AWL: AWL client and stakeholder perspectives on peer recruitment and implementation	**Objectives** - Elicit AWL client and stakeholder perspectives to inform the development of a bespoke peer support intervention for AWL. - Explore perceptions of desirable demographic peer characteristics among AWL clients and stakeholders
	Key Findings - AWL clients de-emphasised the importance of demographic characteristics but highlighted peer positivity and empathy as essential personal characteristics. - Implementation of peer support within AWL was positively regarded as a means to increase provision of emotional, motivational and informational support to AWL clients - Peer acceptability was anticipated to be greatest among older AWL clients, therefore, peer implementation should be targeted according to when older clients accessed the scheme
Study Five - Acceptability of the AWL peer intervention: Evidence of promise and lessons for the future	**Objectives** - Explore initial acceptability findings from the AWL peer intervention from the perspectives of EROs, peers and clients. - Explore evidence of promise for the AWL peer intervention to foster shared social identity among AWL clients.
	Key Findings - The AWL peer intervention had high acceptability among EROs, peers and clients - Preliminary evidence of promise is presented for the ability of AWL peers to promote shared social identity among clients - Social identity principles underpinned the provision and receipt of social support between AWL peers and clients - Recommendations and practical guidance are presented to guide peer recruitment and implementation within comparable ERS contexts.

Chapter 9: General discussion

Summary of thesis aims and objectives

This thesis documents the exploration and intervention development of a social identity-informed intervention to promote greater AWL completion. Further, despite acknowledgement of vast heterogeneity among different ERSs, this thesis sought to propose a transparent, contextually appropriate approach to guide the integration of structured peer support within ERSs. In pursuit of these specified aims, chapters four and five outlined who accessed AWL, who was more likely to complete the scheme, and physical, behavioural and well-being outcomes associated with completion. Chapter six presented a qualitative exploration of perceived facilitators and barriers to AWL completion and obtained insight into the social support preferences and experiences of AWL clients. These chapters were fundamental for attaining greater contextual understanding of the AWL scheme. AWL presented a novel ERS due to the widespread recruitment of self-referrals and its provision across leisure sites located within areas of contrasting socioeconomic deprivation. Subsequently, chapters four, five, and six explored the extent to which these factors may have impacted AWL uptake, completion and outcomes in comparison to previously published ERS evaluations. Establishing AWL as suitably comparable to other ERSs provided rationale that the subsequent social-identity informed intervention may be transferable across other ERS contexts. This thesis identified a peer-based intervention underpinned by a social identity approach as the optimal means to enhance perceptions of social support among AWL participants. A range of AWL stakeholders contributed to the development of the intervention, providing feedback on preferred peer demographic and personal characteristics, and roles. The subsequent AWL peer support intervention demonstrated high acceptability among AWL EROs, peers and clients. Chapter 8 also provides details of practical considerations impacting implementation and retrospective acceptability of the AWL peer support intervention. Thorough delineation of the content of the intervention pertaining to peer recruitment, peer

roles, and the operationalisation of peers was presented to ease transferability across comparable ERS contexts. Moreover, transparent documentation of each stage of the intervention's development and implementation provides guidance for the integration of structured peer support within ERSs that differ from AWL.

Summary of main findings

Study one explored rates of AWL uptake and completion. As expected, self-referral represented the primary mode of AWL referral (55.2%), far exceeding the prevalence of self-referrals identified within previous ERSs (Hanson et al., 2013; Kelly et al., 2017; McGeechan et al., 2018). Despite slightly lower rates of completion, AWL uptake and completion rates were comparable with previous ERS evaluations. Further, socio-demographic patterning of AWL uptake and completion were similarly representative of previous ERSs, identifying a positive association between age and AWL uptake and completion. This represents the most consistent findings among ERS literature (Campbell et al., 2015; Kelly et al., 2017), with little consensus regarding the association between other demographic and referral characteristics and ERS uptake and completion (Hanson et al., 2013). Males were most likely to complete AWL, whilst those from the most socioeconomically deprived areas were least likely to uptake and complete. Similar to Hanson et al. (2013) and Parretti et al. (2017), 82.1% of AWL referrals were overweight or obese. There was a positive association between referral for musculoskeletal health and CVD and uptake and completion, though an opposite trend for those referred due to mental health was observed. In line with Campbell et al. (2015), a positive association existed between greater pre-AWL PA and AWL uptake. Subsequently, study one fulfilled its aim to demonstrate the prevalence and socio demographic patterning of AWL relative to other ERSs. The identified similarity between AWL and other ERS uptake and completion rates presented three-fold implications: (1) that development of a bespoke intervention to enhance rates of AWL completion may produce comparable benefit to other

ERSs; (2) permitting access to ERSs via self-referral represents a feasible means to promote easier access to ERSs for prospective clients without substantial negative implications for rates of uptake or completion; (3) recurrent ERS evaluations are failing to produce meaningful clarification to aid understandings of who accesses and completes schemes. In-depth understanding of factors linked to uptake and completion enable tailoring of ERSs to participants that are best positioned to benefit from them (Pavey et al., 2011). However, the complexity and subjective impreciseness inherent within ERS evaluations create difficulties for research to accurately identity such factors. Nowhere is this more apparent than within classifications of primary reason(s) for referral. Classification of participants according to a primary reason for referral of CVD or obesity may be considered crude given the prevalence of ERS participants that report multi-morbidity of health conditions (Prior, 2019). However, failure to identify primary reason for referral category may yield far lesser practical utility. Reducing participants to one definable characteristic, such as age, sex or primary reason for referral fails to appropriately recognise the complex interrelated nature in which these factors are likely to interact to influence ERS uptake and completion. Consistent with James et al. (2009) and Hanson et al. (2013), a large amount of variance existed in the model to predict AWL completion beyond the inclusion of referral and demographic characteristics Subsequently, failure to identify consistent demographic and referral characteristics associated with ERS uptake and completion may indicate that these factors are of lesser significance than which they have previously been regarded.

Study two similarly strived to position AWL in the context of other ERSs in relation to physical, behavioural and well-being outcomes associated with AWL completion. Positively, AWL completers achieved significant reductions in BMI, SBP and sitting time, alongside significant increases in PA volume and well-being. Changes in AWL completer outcomes were

compared with recent findings from the NRD (Rowley et al., 2019b; Wade et al., 2020). Consistent with Wade et al. (2020), AWL completers achieved small significant reductions in BMI and SBP. Wade et al. (2020) conclude that such marginal reductions are unlikely to facilitate a meaningful improvement in health. Notwithstanding, this stance fails to adequately acknowledge the heterogeneity of ERS participants. Study two identified significant differences in BMI reduction relative to participants' BMI classification status and primary reason for referral. Notably, obese referrals and those referred due to diabetes achieved the greatest reductions in BMI. In contrast, healthy weight referrals and those referred due to mental health did not significantly reduce BMI. AWL completers evidenced similarly discrepant SBP outcomes according to their primary reason for referral. Notably, those referred due to diabetes achieved a substantial reduction in SBP which may be associated with reduced CVD and all-cause mortality risk (Bundy et al., 2017). AWL completers reported greater PA volume at baseline and greater increases in PA volume compared to analyses of NRD data (Steele et al., 2019; Rowley et al., 2019b). AWL participants reported a significant increase in PA volume irrespective of primary reason for referral, though PA volume varied considerably at both baseline and completion. Pre-post well-being scores also varied substantially according to primary reason for referral. Positively, AWL participants referred due to mental health reported markedly improved well-being upon scheme completion. Consequently, study two identified a host of positive physical, behavioural and well-being outcomes associated with AWL completion. Further, study two's findings highlight the need to explore differential ERS outcomes attributable to differences in primary reason for referral. Substantial referral condition-specific differences in physical, behavioural and well-being at ERS baseline and completion can mask the true magnitude and 'meaningfulness' of identified health-related ERS outcomes.

To date, a plethora of research has explored facilitators and barriers to ERS uptake and completion. However, the AWL evaluation data presented in studies one and two represent the most recent evidence to demonstrate rates of ERS uptake and completion are not improving. Collectively, these findings indicate that greater knowledge of facilitators and barriers has failed to facilitate meaningful improvements in ERS completion rates. Three primary implications arise from this conclusion: (1) ERS deliverers and practitioners are failing to suitably modify schemes to incorporate enhanced understanding of facilitators and barriers; (2) the breadth of identified facilitators and barriers do not accurately reflect the complexity of ERS adherence behaviour; and (3) identified facilitators and barriers have poor generalisability across different ERS contexts. Study three sought to identify salient facilitators and barriers to AWL completion. Further, often cited as a primary facilitator of ERS completion (Morgan et al., 2016), study three explored the role and perceived importance of social support among AWL clients. Critically, facilitators and barriers identified by AWL clients were fundamentally equivalent to those identified by previous ERS literature (e.g., Wormald & Ingle, 2004; Vinson et al., 2012; Morgan et al., 2016). However, study three extends current understanding via the identification of higher order factors to influence perceptions of facilitators and barriers. Specifically, the extent of AWL participants other commitments and prior PA experiences were central to participants' experiences. AWL participants entering the exercise environment for the first time reported different barriers, such as greater anxiety and PA-related pain, and lower self-efficacy than those with greater prior PA experiences. ERS participants comprise an eclectic and heterogenous population (Wade et al., 2020), therefore, the propagation of all-encompassing facilitators and barriers to ERS completion are inappropriate. However, ERSs are typically small-scale, under-resourced public health programmes that are unlikely to have the capacity to support clients on a one-to-one basis. Study three's identification of higher order factors to influence perception of facilitators and barriers provides ERS professionals with an

expedient and accessible means to identify which facilitators and barriers are likely to be most applicable to new clients. Additionally, study three identified that AWL clients' views vary with regard to the perceived role and importance of social support. Participant views contrasted from being uninterested in social interaction to the development of deep and valued friendships through AWL. Others were satisfied via regular engagement in brief, friendly social interaction with other AWL clients. Even in instances where direct social interaction was considered undesirable, clients expressed satisfaction and belongingness stemming from perceptions of being 'in the same boat' as other clients. Thus, study three presents social support as a universal facilitator to AWL completion. However, study three also highlighted the saliency of ensuring future attempts to enhance social support provision remained flexible and autonomy-supportive to reflect differential AWL client attitudes and preferences.

Study three's findings directly informed the decision to develop and implement an intervention to enhance AWL client's perceptions of social support using peers. Peers were conceptualised as individuals who had previously completed AWL's ERS and could provide encouragement and experiential knowledge to new AWL clients, thus facilitating AWL completion. Peers were deemed able to intuitively modify the level and frequency of offered social support in line with client preferences. The peer support intervention was developed in accordance with the social identity approach. Specifically, peer acceptability was considered to be intrinsically linked to the extent to which clients could perceive similarity between themselves and peers. Study 4 presents feedback from AWL providers and clients on desired peer demographic and personal characteristics, as well as peer roles and practical guidance designed to aid peer integration within the AWL context. Clients disregarded the importance of demographic similarity between themselves and peers, though emphasised the saliency of positivity, empathy and humour. The ability for peers to demonstrate that they had experienced

some form of medical condition and accessed AWL as a means to positively enhance their health and well-being served as a foundational platform for similarity, and thus, shared social identity, among all AWL clients. Peers were anticipated to provide additional sources of emotional, motivational and informational support to AWL clients. Subsequently, peers were envisioned as a means to directly address a plethora of prominent barriers to AWL completion identified within study three. Specifically, peers were ideally positioned to provide friendly welcomes and social support to new clients to mitigate the initial anxieties associated with joining AWL. Further, peers were able to offer reassurance to those with low-PA self-efficacy by sharing stories of their initial personal struggles and how they were able to overcome them to achieve scheme completion. AWL providers offered valuable insight to inform the development of a contextually appropriate, acceptable peer intervention. Feedback included tailoring the scheme towards older adults to maximise the acceptability and scope of the intervention and offering incentives to promote peer commitment. Study four's findings directly informed the development of the AWL peer support intervention, including peer recruitment and training practices. Although developed bespoke to complement the specific needs and structure of AWL, the approach adopted by study four presents a transferable model to guide the recruitment and implementation of peers across different ERS contexts.

The final study presented retrospective acceptability findings of the AWL peer support intervention. Peer support is a nebulous concept that encompasses a wide variety of roles and responsibilities (Matz-Costa et al., 2019). Hulteen and colleagues (2019) highlight the need for peer support evaluations to provide greater precision and clarity over the exact nature and content of peer roles. Failure to provide sufficient clarity of peer roles hinders the transferability of successful peer support interventions to different contexts (Hulteen et al., 2019). Study five presents the first empirical evidence to document the implementation of a

peer support intervention within the context of exercise referral. Specifically, study five clearly delineates the exact roles peers played within the structure of AWL, provides insight into differing peer approaches, and outlines factors linked to peer acceptability among various stakeholders. Overall, EROs, peers and clients deemed the AWL peer intervention to have high acceptability. Peers were valued among EROs and clients as a means to reduce burden on EROs and for contributing to a friendly, welcoming exercise environment. Peers themselves were acceptable to the role due to enhanced feelings of fulfilment attributed to opportunities to support others. Attendance of peers remained consistent throughout, though short and long-term peer absences occurred as a result of health deterioration. In some instances, perceived demographic similarity influenced peer acceptability among AWL clients. Specifically, some clients expressed preference for peers of the same age and/or sex, or attributed age similarity to positive peer-client relationships. Study five also provides supporting preliminary evidence of promise for peers to contribute to the adoption of shared social identity within an ERS context. Shared social identity among peers and AWL clients underpinned enhanced feelings of comfort and reduced anxiety. In conclusion, study five outlines prominent factors to influence the acceptability of the AWL peer support intervention. These findings provide a template to guide peer recruitment and implementation within different ERS contexts.

Original contributions to knowledge

This thesis comprises several contributions to knowledge that are, to the author's knowledge, novel and meaningful. Previous ERS evaluations have largely been limited to schemes which exclusively restrict access to participants unless referred from primary or secondary health care providers (Campbell et al., 2015). Hanson et al. (2020) recently highlighted that the evolving nature of ERS has led to the adoption of non-traditional delivery and recruitment practices, such as the embracing of self-referrals within some ERSs. Subsequently, this thesis represents the first ERS evaluation to include a substantial number of

self-referral participants. Moreover, despite the long-time espousal of a positive association between social support and ERS completion (e.g., James et al., 2007; Vinson & Parker, 2012), to date, this thesis denotes the most thorough exploration of social processes operating within an ERS context. Specifically, this body of work uses a social identity approach to extend previous findings by investigating salient demographic and personal characteristics to influence the perceived receipt and provision of social support among ERS clients. The application of the social identity approach is novel within an ERS context, representing a diversion from the predominant use of individualist behaviour change theories (e.g., Self-Determination Theory) to explain ERS behaviour (Markland & Tobin, 2010). Further, peer support interventions are commonly plagued by imprecise definition of peer roles and improper delineation of the central foundations of what constitutes 'peerness' (Matz Costa et al., 2019). As such, the transferability and generalisability of peer support interventions are hindered by a disproportionate emphasis on the effectiveness of such interventions (Ginis et al., 2013), rather than focussing on how interventions can operationalise peers successfully within a particular context. This thesis comprises the first attempt to develop and implement a social-identity-informed peer support intervention within an ERS context. In addition, all aspects of the intervention's development are transparently presented, including a prior needs analysis of the context, a person-centred approach to peer identification and recruitment, and a multi-stakeholder exploration of the intervention's acceptability. Resultingly, this thesis offers a framework to guide the structured implementation of peer support within comparable ERSs and public health contexts.

Principal considerations

Several key themes relating to the conceptualisation, delivery and evaluation of AWL, and ERSs more generally, have surfaced as a result of this thesis and are presented below.

These do not represent an exhaustive list of ERS-related considerations but have been selected in order to highlight the areas in which this thesis contributes to enhanced understanding of current and future ERS research and practice.

Contested interpretations of successful exercise referral

Existing NICE (2018) guidance for ERS is vague and ill-defined. Undoubtedly, this is a consequence of ERSs prematurely achieving widespread proliferation without an established evidence base to support their effectiveness (Dugdill et al., 2005). NICE (2018) remain unable to define discrete subpopulations who are most likely to benefit from ERS participation, and resistant to advocate the use of a uniform 'gold-standard' ERS format (Oliver et al., 2016). The lack of prescriptive guidance has done little to quell the myriad of contested interpretations which exist both within (Henderson et al., 2018) and between ERSs (Wade et al., 2020). Fundamentally, the absence of agreed consensus surrounding the overall purpose and appropriate physical and well-being outcomes of ERS presents an insurmountable obstacle to their demonstrable effectiveness. Specifically, it is inherently difficult to perform accurate comparisons of effectiveness between different ERSs due to the extent to which schemes themselves vary. By definition, AWL can be reasonably compared to other ERS evaluations reported by Hanson et al. (2013) and Prior et al. (2019). However, only blunt comparisons of effectiveness can be performed due to differences in scheme format, duration, and the sociodemographic characteristics of participants. For instance, AWL lasted for only 12 weeks rather than the 24 week-ERS documented within Hanson et al. (2013) and Prior (2019). AWL also readily accepted participants via self-referral, whereas the other schemes did not. In further contrast to Hanson et al. (2013), AWL did not offer group provision, preferring to offer supervised drop-in sessions. Ultimately, without detailed prescriptive policy guidelines, ERSs may continue to expand and contort to facilitate local provider preferences and innovations in

service provision (Oliver et al., 2016). Alas, whilst this may lead to the development of individually successful ERSs like AWL, it limits the ability to meaningfully contribute to the wider ERS evidence base. That is, cross scheme comparisons are only able to identify superior, or inferior forms of ERSs, rather than contributing to understanding of the effectiveness of ERSs as a singular model of intervention.

In a similar vein, ERSs have become a holistic health enhancing panacea lacking clear purpose and direction (Oliver et al., 2016). Traditionally, ERSs are regarded as PA interventions for insufficiently active or sedentary individuals with an existing, or at risk of developing a, physical or psychological health condition (NICE, 2018). As described by Wormald and colleagues (2006), ERSs fill a gap in service provision by providing much needed service to sedentary, older, unfit, and overweight individuals, many of whom live within socioeconomically deprived areas. Wormald et al's. (2006) conceptualisation is consistent with the sociodemographic profile of AWL participants. Moreover, Wormald et al. (2006) argue ERSs provide essential support for these individuals to make rudimentary first steps towards healthier, more active lifestyles. Subsequent reviews by Pavey et al. (2011) and Campbell et al. (2015) collectively recognise ERSs as facilitating a small short-term increase in PA. Ambiguously, these findings are often conceptualised as representing a failure of ERSs, particularly in relation to the ostensibly superior cost-effectiveness of brief PA advice (NICE, 2018). Further, this conceptualisation was reached without sufficient evidence to explore long-term ERS outcomes. Recent work by Prior et al. (2019) found a 6-month ERS to facilitate sustained long-term PA behaviour change. Thus, there is evidence to indicate that ERSs are fulfilling the role in which they were originally intended. Moreover, ERSs are often targeted at the least physically active subpopulations, such as those that have existing long-term health conditions, are overweight or obese, and from socioeconomically deprived areas (Sport

England, 2019). Disconcertingly, it is unclear why even small improvements in PA within these sub-populations should not be considered successes, particularly as the health promotion messaging surrounding PA is changing (e.g., 'some is good, more is better' (DHSC, 2019)). This stance of DHSC (2019) acknowledges the health enhancing benefits that can be achieved among the least active via increased PA below the threshold of 150 mins/week MVPA (Wafsy & Baggish, 2016). Further, there is need for guidance on what constitutes a meaningful, realistic target level for increased PA following a typically short, 8-12-week ERS intervention. Within AWL specifically, participants reported large significant increases in PA and large reductions in sitting time. It is unclear why the PA increase reported by AWL participants appeared to be considerably greater than previous ERS evaluations, however, it is likely that bespoke AWL features, such as the largely unrestricted access to exercise facilities, and other contextual scheme differences between AWL and other ERSs discussed in chapter 5 had an influence.

Notwithstanding, the use of different PA measures and an all-encompassing overreliance on self-reported PA are likely to contribute to the variable PA outcomes reported by different ERSs. IPAQ is becoming the most prevalent PA measure used among ERS evaluations (e.g., Rowley et al., 2019b; Prior et al., 2019), with this thesis utilising the IPAQ-E variation for the AWL evaluation in chapters 4 and 5. However, the IPAQ, by design, is a population-level PA surveillance tool and is not strictly intended for examination of PA change, therefore, it may not provide an accurate representation of actual PA change behaviour (Lee et al., 2011). The use of IPAQ-E in this thesis represented a significant upgrade on the existing AWL PA assessment tool via the introduction of a standardised, validated instrument that could be compared against other ERSs. The introduction of IPAQ-E was deemed acceptable by AWL providers as it could be quickly administered by EROs during assessment appointments.

Nonetheless, the use of IPAQ and similar self-report measures is a fundamental limitation of this thesis and wider ERS research. Problematically, the implementation of accelerometery-based PA measurement has negative cost implications and poor acceptability among UK-based ERS (Hawkins et al., 2019). Taken collectively, it can be argued that sufficient tools do not currently exist among ERS to accurately assess the potential impact of ERS on PA behaviour change.

Alongside PA and sedentary behaviour change, ERSs are also routinely evaluated based on their ability to facilitate reduced BMI and blood pressure, and improved well-being (e.g., Wade et al., 2020). However, evaluations rarely include exploration of outcomes among discrete sub-populations (Prior, 2019). ERS are comprised of a heterogenous sample of participants in relation to age, sex, reason(s) for referral, physical activity levels, and weight status (Wade et al., 2020). Thus, holistic evaluations and analyses of ERS using whole ERS samples are insensitive to potentially meaningful outcome changes occurring within sub-populations. As evidenced within chapter 5, reported physical, behavioural, and well-being outcomes varied according to participant's primary reason for referral. Accordingly, it is inappropriate to continue investigating the effectiveness of ERSs on PA and physical health and well-being, without taking into account the heterogenous sociodemographic characteristics of ERS participants. Future engagement in this practice will facilitate the necessary transition away from attempts to assess the effectiveness of ERSs as a whole and enable greater understanding of who ERSs may be effective for, and how.

The appropriateness of self-referral

Traditionally, ERS participation has required a formalised referral from a primary or secondary care provider (NICE, 2014). According to Hanson et al. (2020), AWL is best

conceptualised as a non-traditional ERS due to the unorthodox, widespread acceptance of self-referrals. There is explicit acknowledgement within Hanson et al. (2020) that ERSs are now embracing self-referrals within existing practice, however, the AWL evaluation in chapters 4 and 5 presents the first ERS evaluation, to date, to explore rates of uptake, completion, and outcomes in this regard. Thus, whilst AWL can be considered a novel ERS among academic literature, it remains unknown how many UK-based ERSs may similarly embrace self-referrals. In the current landscape, the arguments supporting the need for a formalised referral from a primary or secondary care provider appear contrived and arbitrary. The existing referral pathway may represent a mechanism to prevent schemes from becoming overwhelmed (Din et al., 2015). However, this argument suggests that primary or secondary care referrers may consciously neglect to signpost eligible participants to the scheme during busy periods, or to ration referrals to the scheme on a selective basis (Din et al., 2015). In reality, it is the responsibility of individual ERSs to manage their own referral capacity and to employ flexible provision to accommodate busy periods. The semi-structured provision of AWL demonstrates a mechanism by which ERS capacity can be enhanced. In contrast, schemes which employ group-only provision, such as Hanson et al. (2013) may require systems to stem new participant flow during busy periods. Notwithstanding, the relatively low completion rate of AWL relative to other ERSs suggest the format may enable a greater volume of participants to enter the scheme but may also enhance dropout risk.

Prior to the evaluation, AWL providers anecdotally expressed concern that the inclusion of self-referrals may result in greater recruitment of 'time-wasters'. However, chapter 4 demonstrated that those referred via primary or secondary care were no more, or less, likely to complete AWL than those who self-referred. Moreover, within 'traditional' ERSs, authors have underscored the prevalence of ERS participants who instigate their own referral to

schemes via GPs (Moore et al., 2011; Din et al., 2015). In-line with current NICE (2018) guidance, eligibility criteria for ERS is vastly inclusive, therefore, the overwhelming majority of those who seek to enter ERSs will be permitted access. Thus, wider acceptance of self-referrals alleviates the unnecessary barrier and collective burden of having to first arrange an appointment with a primary or secondary health care provider. Within AWL specifically, all participants attended a mandatory assessment appointment with an ERO, regardless of whether they accessed the scheme via self-referral or otherwise. Therefore, the requirement for an initial referral from primary or secondary care is superfluous.

Undoubtedly, some individuals are unaware of the detrimental consequences of their unhealthy lifestyle behaviours and may require a primary or secondary care provider to directly signpost them to ERSs (Markland & Tobin, 2010; Queen, Crone, & Parker, 2015b). Thus, the primary argument is that self-referrals should be embraced to supplement, rather than replace, traditional referral pathways. Notwithstanding, prevalent concerns exist in relation to the extent of primary and secondary care providers knowledge of ERSs, and their willingness to refer to ERSs (Wormald et al., 2006). Moreover, from an individual psychological perspective, participants who seek their own referral may be more readily accepting of ERSs in respect of being more motivated to engage in PA behaviour change, and subsequently, less likely to drop out. Chapter 4 of this thesis suggests self-referrals were no more or less likely to drop out of AWL, however, this comparison is likely confounded by the inclusion of participants who sought their referral via a primary or secondary care provider.

Bridging the gap between theory and practice

There is a lack of evidence to suggest that 20+ years of academic evaluation and investigation has positively contributed to the enhanced effectiveness of ERSs (e.g., Pavey et

al., McGeechan et al., 2018; Hanson et al., 2020). More acutely, little has been done to improve rates of ERS uptake and completion (Chapter 4). Inauspiciously, there is also a lack of evidence to indicate that academic investigation has facilitated successful modifications being made to ERS practice. In part, this may reflect an assumed overestimation of the generalisability of ERS findings. As highlighted above, it is now inappropriate to recognise ERSs as representing a distinct form of PA intervention as the term no longer reflects the myriad of heterogenous schemes operating under this banner (Hanson et al., 2020). Problematically, the heterogeneity between ERSs mitigates the potential applied value of qualitative findings on facilitators and barriers to ERS completion. To date, there exists an abundant literature to document factors associated with increased likelihood of ERS completion, as well as barriers associated with increase dropout risk (Morgan et al., 2016). However, findings are often generic in order to be broadly applicable to different ERSs (e.g., Wormald et al., 2006). As such, there is a comparable lack of knowledge regarding how to practically employ ERS-specific behavioural strategies to promote participants exposure to facilitators and restrict exposure to barriers. Further, there is common failure to appreciate the complexity in which individual facilitators and barriers interact over time (Hanson et al., 2019).

Consistently, academic publications outlining facilitators and barriers to ERS completion are not followed by the development of bespoke interventions designed to address the identified issues within the context in which they emerged. For instance, there is scarce evidence of documented attempts to modify ERS delivery by utilising structured social support as a primary facilitator, despite the frequently cited salience of social support (e.g., Vinson & Parker, 2012; Morgan et al., 2016).Thus, it is an alarming prospect that identified facilitators and barriers are not effectively communicated to ERS providers in a manner that can facilitate meaningful change, inherently mitigating their applied impact and subsequent value. This

thesis sought to address this gap by presenting an in-depth exploration of bespoke intervention development within a specific ERS context. Subsequently, the findings are of direct applied valued to comparable ERS contexts, as well as providing a guiding template for the implementation of structured social support, via peer volunteers, within other ERS contexts.

Strengths and limitations

To date, there exists a dearth of research to document the implementation of peers within an ERS context. Further, there is a comparable lack of peer support literature to clearly explicate and delineate peer recruitment, peer training and peer implementation practices (Hulteen et al., 2019). This thesis addresses both prominent gaps in the literature by comprehensively documenting the development and prospective and retrospective acceptability of a peer support intervention for exercise referral. Subsequently, this thesis directly informs the implementation of peers within comparable ERS contexts. More broadly, the thesis presents a foundational platform to guide peer implementation across a wide range of public health initiatives. Specifically, public health initiatives should seek to involve various stakeholders to inform peer recruitment, peer training and the development of valued and contextually appropriate peer roles. Thus, a key strength of this thesis lies in its contribution to generalisable and transferable knowledge for peer implementation practice. Relatedly, this thesis culminated in the implementation of a bespoke peer support intervention which reported high acceptability among AWL providers, peers and clients. The ability of the intervention to yield a tangible positive impact across a wide range of AWL stakeholders represents an additional key strength of this thesis. Embedding the intervention within a social identity approach represents an innovative and previously untested application of the approach within the context of peer support. Comparably, this thesis presents the first attempt to utilise social identity principles to enhance peer support within exercise referral. The social identity approach underpins the recognition, provision and receipt of social support (Haslam et al., 2012) and thus, presents an appropriate, though previously underutilised, theoretical perspective from which to explore how to maximise perceptions of social support within an ERS context. The investigation of meaningful ways in which AWL clients may differ in respect of uptake, completion and physical, behavioural and well-being outcomes exemplifies a final

fundamental strength of the thesis. ERS clients are heterogenous in age, sex, reason for referral, socioeconomic deprivation and employment status (Wade et al., 2020). Notwithstanding, previous ERS research has collectively evaluated ERS as though ERS clients represent a discrete, homogenous population. That is, exploring the effectiveness of ERSs to facilitate greater PA and reduced BMI and BP, without taking into account individual-level demographic and personal factors that may confound analyses. This thesis demonstrated the utility of exploring the effectiveness of ERSs according to reason for referral. Future work should continue this trend to aid further comprehension of who benefits from ERS participation and how (Pavey et al., 2011; Hanson et al., 2019).

Inescapably, this thesis has several limitations which should be acknowledged. Principally, these limitations are centred around the AWL evaluation presented in studies one and two. The AWL evaluation was not an RCT, nor did it include a relevant comparison group, thus, identified physical, behavioural and well-being outcomes cannot be causally attributed to AWL completion. This remains an objective criticism despite previously presented arguments surrounding the validity of using RCT's to conduct ERS evaluations. Data collection for a multi-site non-randomised cluster trial to determine the impact of AWL peers ceased prematurely as a consequence of Covid-19. No peers were implemented within the Burscough site to provide a comparison group to the Skelmersdale and Ormskirk leisure sites. Adoption of the non-randomised cluster design would have facilitated multi-site comparison of AWL client outcomes pre-post peer support intervention. Additionally, evaluation data presented within study two would act as baseline measures for each site to investigate pre-post outcome changes within each respective site. Accordingly, there is evidence that this thesis made a deliberate attempt to implement a more rigorous evaluation of AWL. The non-randomised cluster approach described above represents a fruitful methodological approach to inform

future ERS evaluations where delivery occurs across multiple sites. However, it is recommended that chosen comparison sites are maximally similar to experimental groups, particularly in relation to area socioeconomic deprivation.

EROs were solely responsible for all primary quantitative data collection. The use of secondary data was a necessary, unavoidable research stratagem given the breadth and scope of the AWL scheme. Notwithstanding, there are several limitations stemming from the utilisation of secondary data. Use of secondary data surrenders a substantial degree of researcher control (McKnight & McKnight, 2011), limiting the ability to minimise missing data. As such, missing data were prevalent within studies one and two, particularly in relation to BMI which necessitated the exclusion of BMI from the regression model. Negligible and inconsistent longitudinal data collection also precluded the ability for the outcome evaluation presented in study two to describe long-term outcomes associated with AWL completion. Similarly, the absence of a rigorous method to record AWL client scheme attendance beyond scheme entry and exit points precluded the ability to control for the potentially confounding influence of attendance frequency on scheme outcomes. Further, AWL scheme length varied considerably among AWL completers, with some clients completing the scheme within as little as 7 weeks and others within 70 weeks. AWL clients comprised a demographically eclectic population, though all were experiencing or recovering from a health condition, and most were aged 65+years. It was common for AWL clients to report short and long-term scheme absences due to a range of health and/or non-health related conditions. Rather than discharge clients for them to repeat the initial referral and induction process, EROs opted to complete final assessments when clients had experienced 12 weeks of the scheme rather than completing the final assessment definitively 12 weeks after clients' initial assessment. It is acknowledged that finite standardisation of data collection for AWL completer outcomes would have provided a

more robust evaluation. However, there remains a lack of clarity surrounding optimal strategies to incorporate best practice ERS evaluation given probable short and/or long-term scheme absences of a majority of ERS clients. Additionally, the use of EROs to recruit AWL clients to interview may be considered a limitation. It is possible that EROs selectively sought to recruit clients known to have had positive AWL experiences and proclivity for sharing details of these experiences with others. Notwithstanding, EROs were purposefully only provided with brief and vague details of the content and focus of client interviews to mitigate selection bias.

Recommendations for practice

There are several practical implications emanating from this thesis. This section comprises proposed recommendations for AWL practice and ERSs overall. Firstly, ERSs should permit prospective participants to access schemes via self-referral. As evidenced within chapter 4, the majority of AWL clients accessed the scheme via this method. Critically, those who accessed the scheme via self-referral were no more or less likely to complete AWL compared to those referred via a primary or secondary care provider. Self-referrals and those referred from primary or secondary care providers were required to attend equivalent initial assessment appointments with EROs, who were ultimately responsible for determining participant eligibility for AWL. Thus, providing the option for prospective participants to bypass primary or secondary services can accelerate access to ERSs. Moreover, the ability to access ERSs via self-referral can facilitate greater access among those who are reluctant to access primary or secondary care organisations. Engaging in community-wide promotion of ERSs presents a viable strategy to promote scheme uptake, whilst alleviating burden on primary and secondary care services. Moreover, the additional upfront costs associated with an expanded promotional campaign are likely to be offset long-term by reduced contact with primary and secondary care providers. However, for such a strategy to be viable, it is essential for ERSs to provide sufficient upfront information pertaining to what participation will entail.

Transparent and comprehensive advertisement can serve to alleviate existing anxieties among prospective clients and allows clients to make an informed decision prior to full commitment to schemes. Consequently, engagement in such practice can suitably enhance scheme uptake, whilst mitigating subsequent dropout risk.

Secondly, AWL and individual ERSs should embed superior evaluation practices within existing scheme structures. Specifically, AWL can benefit from a comprehensive restructuring of their current evaluation practice. This can be achieved via departure from a solely paper-based recording method to the adoption of a sophisticated, electronic central filing system. The quantitative AWL evaluation comprised within chapters 4 and 5 is limited by missing data values. Transition towards an electronic system can facilitate quicker recognition and rectification of missing data values and places greater accountability on individual EROs to ensure paperwork is complete. Moreover, AWL can benefit from better recording of participant attendance. Comprehensive reporting of participant attendance data enables investigation of AWL outcomes relative to frequency of attendance. Moreover, it allows EROs to identify long-absent participants and attempt to intervene to reintroduce them back into the scheme, reducing the incidence of dropout. Additionally, better recording can provide insight into why scheme duration varies so excessively among AWL participants. In future, AWL should seek to establish clear guidance for cases where participants are unable to continue scheme participation for the 12-week duration, or at least record the specific reasons to explain instances where participation extends beyond 12-weeks.

These recommendations extend to ERSs in general due to pervasive, widespread limitations of missing data (Prior, 2019) and the lack of ERS attendance data (Shore et al., 2019) among ERS literature. Indubitably, local ERSs, such as AWL, are subject to significant

budgetary limitations, which seemingly preclude the allocation of funding to improve evaluation practice. Notwithstanding, the importance of robust evaluation practice cannot be underestimated, especially as schemes like AWL compete for funding on a cyclical basis, requiring a new tender every 3-4 years. Embedding robust evaluation practice enables schemes to provide comprehensive data to support their effectiveness, or at least present in-depth contextual understanding of factors influencing poor effectiveness, which are of immeasurable value to prospective funders.

Thirdly, lack of time and perceived insufficient social support are prominent barriers to ERS completion (Morgan et al., 2016). Problematically, to date, there is a lack of evidence to document strategies to address these barriers simultaneously. For instance, AWL offered a flexible scheme where participants could access the scheme at various times throughout the week via attendance of drop-in sessions. In contrast, some ERSs, like Hanson et al. (2013) are entirely group-based. Accordingly, the ability for participants to access consistent social support may be enhanced within group based ERSs, though access to such schemes is restricted to those with fewer time commitments. Opposingly, AWL accommodates a greater breadth of participants due to the flexible scheme structure, though consequently may be unable to provide social support to the same extent. Benefits to AWL's approach include expanded capacity for participants accessing the scheme, removal of the need for waiting lists among group-based ERSs and greater access among those with low social confidence who may be initially deterred from joining groups. However, the AWL structure also resulted in unpredictable turnover of participants and loss of social contact. As documented within chapter 6, some participants were unable to identify other AWL participants compared to community gym users which may have precluded the development of social interaction and rapport. In other interviews, participants spoke of losing contact with their fellow scheme users and being unsure if this was due to them

completing the scheme, falling ill, or an otherwise explanation. Thus, the flexibility of AWL's approach can impede participants' abilities to develop and maintain social support. Critically, this thesis demonstrates that these limitations can be addressed via the integration of peer support to supplement ERO support. The AWL peer support intervention provided a viable, collectively acceptable approach for augmenting the availability of social support within an ERS context. Thus, peers present a cost-effective means of providing extra support that can be specifically tailored to suit heterogenous ERS contexts. This thesis provides an overarching methodology to guide the incorporation of peers within ERSs via consideration of who peers should be, what roles and responsibilities they can perform, and context-specific facilitators and barriers to the incorporation of peer support. Overall, this thesis recommends, where possible, recruitment of peers of varying ages and medical conditions in order to promote perceptions of similarity among the heterogenous ERS client base. Notwithstanding, peers must possess an empathetic and positive demeanour, as well as high-level interpersonal skills in order to establish and maintain social relationships with fellow scheme users.

Recommendations for research

Moving forward, the following areas should be considered and addressed within future ERS and/or peer support literature. First, there is need for ERS evaluations to explore physical, behavioural and well-being outcomes relative to participants' primary reasons for referral. The findings of chapter 5 highlighted participants' primary reasons for referral as a salient characteristic to influence what may constitute a meaningful health-related improvement following ERS completion. Here, those referred due to a mental health condition were the only category to report a BMI increase upon completion, though they also had the lowest BMI at baseline. Positively, those referred due to a mental health condition saw the greatest improvement in well-being. These findings represent important support for the effectiveness

of AWL, and ERSs in general, that are not captured within analyses using complete ERS samples. Further, the amalgamation of participants without stratification by reason for referral weakens estimates of ERS effectiveness on physical outcomes, such as BMI and BP. Specifically, Wade et al's. (2020) interpretation of ERSs as facilitating significant, but ultimately unmeaningful improvements in BMI and BP is contestable when considering post-ERS changes relative to primary reason for referral. Thus, future work should continue exploration of ERS outcomes according to primary reason for referral, as well as other salient demographic criteria, such as baseline weight status (Parretti et al., 2017). Further, though classifying participants' primary reason for referral as 'multi-morbidity', as in Prior (2019), is likely to provide a more accurate reflection of health status, it ultimately negates possible identification of who ERSs may be most effective for, and how. Accordingly, where possible, it is advised that researchers seek to identify an individual, specific primary reason for referral.

Second, it is essential that researchers provide clear and comprehensive descriptions of individual ERSs. Currently, the concept of ERS is plagued by contested interpretations and vast heterogeneity both within and between schemes (Henderson et al., 2018). Rather than a unified body of evidence, the existing ERS evidence base comprises evaluations of disparate PA interventions of different lengths and primary delivery methods. Perhaps unsurprisingly, this has culminated in modest and inconsistent evidence of ERS effectiveness (Campbell et al., 2015). In response, Hanson and colleagues are currently developing a taxonomy designed to improve the standardisation of ERS reporting. When available, future researchers are encouraged to engage with the taxonomy in order to improve the accuracy and validity of between ERS comparisons. Moreover, further expansion and refinement of the national referral database (Steele et al., 2019) will enable large scale analyses of ERS outcomes by salient demographic and referral characteristics. In its current guise, the NRD comprises outcome data

from a disparate assortment of ERSs across the UK. Indeed, both initial observations of physical health and well-being (Wade et al., 2020), and PA outcomes (Rowley et al., 2019b) have highlighted the pervasive influence of individual-ERS heterogeneity. Moving forward, Hanson and colleague's taxonomy and the NRD have the potential to complement each other harmoniously. In this vein, individual schemes within the database can be reviewed and classified using the taxonomy, followed by large scale comparison of outcomes relative to schemes which employ similar delivery methods. Ultimately, this practice will extend the literature by moving beyond simplistic exploration of ERS effectiveness as a whole, to more precise investigation of whether certain ERS formats are demonstrably more effective than others.

Third, the above recommendation remains relevant for qualitative ERS research. There exists a body of literature to document facilitators and barriers to ERS completion (Wormald & Ingle, 2006; Vinson & Parker, 2012; Morgan et al., 2016), however, the generalisability of these findings may be low given the identified heterogeneity between different ERSs. More acutely, the principal argument here is not that commonly identified barriers, such as a lack of time or insufficient social support are not appropriate, rather that these findings have limited practical usefulness when stripped away from the specific contexts in which they are identified. Ultimately, there exists a comprehensive awareness of potential facilitators and barriers to ERS completion without an accompanying body of work to demonstrate how to promote facilitators and restrict exposure to barriers in an ERS context. Critically, this may explain why there is no discernible improvement in ERS effectiveness across the past 20 years (Hanson et al., 2020). Taken collectively, this highlights the absence of an established link between academic evidence and real-world ERS practice. Notably, following publication of facilitators and barriers to ERS completion identified within a specific context, there is a lack of follow up

evidence to document how awareness of these factors has informed the development and implementation of a bespoke intervention to enhance ERS effectiveness. This thesis sought to directly address this gap in the literature, though future work is required to expand the current findings. Correspondingly, there is need for further exploration of how identified facilitators and barriers may interact.

Fourth, there remains need for greater delineation of peer recruitment practice and clear outlining of peer roles (Ginis et al., 2013). The term 'peer support' is vague in that it can be used to describe an array of different behaviours (Matz-Costa et al., 2019). For instance, as highlighted in chapter 8, AWL peers had different approaches to providing social support despite receiving the equivalent training packages. Thus, future research to document the effectiveness of peer support interventions should look to provide sufficient contextual detail of how peers are operationalised in order to aid replication. In doing so, valuable lessons may also be gleaned from 'ineffective' peer support interventions if there is sufficient description that may indicate why the peer support intervention may have failed to yield the desired outcome(s). Future research should continue investigation of peer support within the ERS context. Perceived social support is a strong consistent facilitator of ERS completion (Morgan et al., 2016), though there is a lack of evidence to document how ERSs may be modified to incorporate and embed social support within provision. As evidenced throughout this thesis, the incorporation of peer support is acceptable across various stakeholders within an ERS context, future research is needed to see if this approach can be similarly replicated across different schemes. Further, there is need to explore the association between an ERS peer support intervention and actual ERS completion rates.

Recommendations for policy and commissioning

The following section provides recommendations to policy makers and commissioners on how ERSs can be modified to improve their effectiveness. Principally, there remains a need to move past the conceptualisation of ERSs as representing a homogenous form of PA intervention. Existing ERS policy guidelines are broad and ill-defined (Oliver et al., 2016), resulting in a myriad of contested interpretations both with and between ERSs (Henderson et al., 2018). Critically, the current evidence base fails to provide holistic understanding of factors associated with ERS effectiveness (Hanson et al., 2020), instead representing a disjointed account of factors contributing to the success or failure of individual schemes. As such, the ERS evidence remains stagnant, as various iterations of ERSs offer contradictory evidence of scheme effectiveness, particularly among demographic sub-populations, such as sex, socioeconomic deprivation and reason for referral (see chapters 4 & 5). Sub analyses of ERSs are critical for informing future ERS policy and driving commissioner decision making for funding allocation. Specifically, exploration of the effectiveness of different iterations of ERSs, such as group-based *vs.* non-group based, allow policy makers to provide more prescriptive guidance on preferred ERS delivery strategies. In addition, continued investigation of health enhancing ERS outcomes among discrete sub-populations enable policy makers to restrict ERS eligibility to those who are most likely to benefit. Currently, ERSs are delivered to adults of all ages, who vary considerably in relation to the number and severity of the health conditions they experience, as well as variation in pre ERS PA volume (Campbell et al., 2015; Wade et al., 2020). Accordingly, the effectiveness and cost-effectiveness of ERSs can be improved by restricting access to discrete sub-populations and channelling resources into tailoring ERS provision to further address the needs of identified groups.

Alternatively, a policy-driven reconceptualization of what constitutes ERS 'success' presents an expedient, cost-effective solution to the vast heterogeneity which exists within and between schemes. As stated by NICE (2014), ERSs are short-term PA interventions for insufficiently active or sedentary adults with existing health conditions. Accordingly, the frequently cited positive association between ERS completion and increased short-term PA volume (Campbell et al., 2015; Rowley et al., 2019) should plausibly be considered a successful impact. Positively, there is also growing evidence that ERS completion is similarly associated with longer-term PA increases (Martin-Borras et al., 2018; Prior et al., 2019). In contrast, the apparent effectiveness of ERSs is brought into question when considering the links between ERS completion and markers of physical health, such as BMI and BP (Wade et al., 2020). ERS completion is associated with modest and variable reductions in BMI (McGeechan et al., 2018; Wade et al., 2020) and BP (Mills et al., 2012; Webb et al., 2016; Wade et al., 2020). However, such health improvements have been deemed insufficient to meaningfully enhance health (Wade et al., 2020). In contrast, the positive association between ERS completion and BMI reduction may be considered a success, particularly in light of the poor effectiveness of short-term PA interventions for reducing BMI (Bull et al., 2020). Nonetheless, the ERS evidence base can progress via the adoption of pre-post changes in PA-volume as a singular ERS outcome. The sole focus on PA neutralizes the potentially confounding influence of participant's varying pre-ERS BMI and BP levels (as evidenced in chapter 5). Moreover, changes in PA volume can be robust to participant heterogeneity in relation to age, socioeconomic deprivation, health status and pre-ERS PA volume by exploring individual-level pre-post percentage increases. In this regard, the current limitation of discrete sub-populations being more or less likely to achieve recommended weekly PA volume levels of 150 mins/week MVPA is nullified. For this to be achieved, policy makers need to advocate and promote the use of a standardised PA measure which can be adopted across all ERSs, as

previously recommended by Hanson (2017). Further, scheme commissioners should consider the role ERSs can play in improving community-level public health, prior to commission. For instance, as described in chapter 1, AWL was initially presented as a weight loss intervention restricted to those with a BMI between 25 - 35kg/m^2. Subsequently, it can be argued that AWL commissioners may have reaped greater return on investment if they had channelled the funding into an alternative scheme specifically tailored to facilitate BMI reduction. Critically, this represents incongruence between the desired commissioner outcomes and the chosen intervention (i.e., ERS), rather than a limitation of the ERS itself.

Conclusion

Overall, this thesis sought to develop and implement a social-identity informed intervention to promote AWL completion. More specifically, in line with research question (RQ) 1, rates of AWL uptake and completion were generally comparable to those evidenced within other ERS evaluations, as were the sociodemographic patterns associated with greater likelihood of AWL completion. Addressing RQ2, AWL participants achieved an array of positive physical, behavioural, and well-being outcomes, including increased PA and well-being, as well as reductions in BMI, BP, and sitting time. However, outcomes varied considerably according to weight status and primary reason for referral. Thus, future evaluations should endeavour to explore ERS effectiveness relative to these salient participant criteria. ERS evaluations that fail to account for these factors may underestimate the potential benefits of ERS participation among discrete subpopulations. For RQ3, AWL completers reported the presence of facilitators and barriers that were comparable with previous qualitative ERS exploration. Notwithstanding, AWL findings extend current understanding by highlighting the predominant importance of ERS participants' other commitments and previous PA experiences as potential grouping factors which subsume an assortment of more minor facilitators and/or barriers. In line with RQ4, AWL completers shed light on their social support expectations and experiences during AWL. Interestingly, despite the frequently cited significance of social support to ERS completion, participants varied in their stated importance of social support, as well as individual social support preferences. Highlighting the need for future ERS social support strategies that are flexible and diverse to satisfy the breadth of participant needs. Chapter 8 addressed RQ5 by identifying desirable peer characteristics as perceived by AWL participants and providers. Participants emphasised the need to recruit peers with high-level interpersonal skills, who could exude positivity and empathy. Peers were anticipated to have greater acceptability if able to demonstrate reciprocal awareness of the ERS

journey and recovery from a significant physical and/or psychological health condition. Future ERSs seeking to adopt peers should target their recruit towards individuals who satisfy these criteria. The subsequent AWL peer support intervention proved contextually appropriate and acceptable among a wide range of AWL stakeholders, meeting the criteria of RQ6. AWL stakeholders were warmly receptive to peers and peer themselves took great satisfaction from the opportunity to provide guidance and assistance to their fellow scheme users. Notwithstanding, future peer support ERS interventions may be enhanced via a more holistic, standardised training procedure. Finally, addressing RQ7, the AWL peer support intervention demonstrated evidence of promise for improving the ERS experiences of AWL participants and providers. Peers were seen as providing auxiliary social support to AWL participants, above and beyond the capacity of EROs alone. The peer role increased the availability of social support among AWL participants and reduced undue burden on EROs. Accordingly, this thesis has prominent implications for future quantitative and qualitative explorations of ERSs, offers guidance to inform the implementation of peers within ERSs, as well as a methodological template to guide peer implementation among a wide array of community public health initiatives.

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Appendices

Appendix A) AWL data collection forms

Confidential Medical Questionnaire

Please **Print** details)
Name……..... Referral Number……..
Age…….
Telephone Number……
Emergency Contact name…….
Emergency Contact number……..

Have you ever experienced any cardiac issues?	[ ] Yes [ ] No ( ) surgery ( ) heart attack ( ) recent angina symptoms ( ) completed cardiac rehab ( ) Pacemaker or ICD ( ) arrhythmia	Date of Heart Attack: …… Did you completed exercise sessions after you heart attack?: [ ] Yes [ ] No Where and when did you complete your exercise sessions? …… What activities have you done since you finished your exercise sessions?: …… Date of Surgery: …… Type of Surgery: [ ] Angioplasty [ ] Bypass [ ] Other Details …… Did you complete exercise sessions after your surgery?: [ ] Yes [ ] No Where and when did you complete your exercise sessions? …… When was your angina diagnosed?: …… Have you been issued with a GTN spray? …… Date of last angina attack? ……..

		How many times GTN spray was used before attack eased?: …….. Cause of attack: [ ] Emotional Stress [ ] Extreme Weather [ ] Exercise [ ] Eating [ ] Other Details : ……
Have you been diagnosed with Diabetes? How is it controlled:	[ ] Yes [ ] No [ ] Diet [ ] Medication [ ] Insulin	If yes: [ ] Type 1 [ ] Type 2 When were you diagnosed with diabetes? …… Do you check your own blood sugar levels? [ ] Yes [ ] No
Have you ever been diagnosed with High Blood Pressure?	[ ] Yes [ ] No	
Have you ever been diagnosed with High Cholesterol?	[ ] Yes [ ] No	
Have you ever experienced chest pain in the past at rest or during exertion?	[ ] Yes [ ] No	Was this investigated i.e. did you go to hospital with it? [ ] Yes [ ] No What do you think the chest pain was caused by?:……
Do you have any Breathing difficulties?	[ ] Yes [ ] No	What is this cause by? [ ] COPD [ ] Asthma [ ] Other Details: …….. Do you use an inhaler?..... If YES which one? ……..

Do you suffer from pain or restricted movement in any joint/joints?	[ ] Yes [ ] No	Which joints?: …….. …… …… What is this pain caused by?: ……..... Does this restrict your activities?: …..……
Are you currently undergoing treatment (or received any in the past) for Cancer?	[ ] Yes [ ] No	If YES please provide details regarding location, treatment, treatment cycles and medication.
Do you have any mental health conditions? E.g. Depression, Anxiety?	[ ] Yes [ ] No	If YES please specify.
Have you ever had a stroke or TIA?	[ ] Yes [ ] No	If YES please specify.
Any other relevant Health information not covered?	[ ] Yes [ ] No	If YES please specify. ( ) epilepsy ( ) hernia ( ) other

Current medication		
Medication Name	**Treatment**	

This confidential questionnaire gives our Activity Referral Officers essential information to create a safe and effective exercise programme.

I confirm that the answers to the above questions are correct to the best of my knowledge. I will also inform an Activity Referral Officer should my health or medications change from my above answers during the 12 week course.

Client Name…… Signature……

GP Referral Officer Name…… Signature ……

Date……

Goals & Measurement

Client Goals ……

<u>Week 1 Measurements</u>: Date:

Height: ……..…… **Weight**:…….……

Blood Pressure: ……..…….. **RHR**:…….. **Waist Measurement (widest**):…….……...

Body Fat %: ……..…… **BMI:** ……..…… **Body Trax completed**

□ **Yes** □ **No**

□ **Tier 1** □ **Tier 2**

<u>Week 12 Measurements</u>: Date Due: …….. **Date Completed:** ……..

Weight:……..…… **Blood Pressure:** …..……..……..……..

RHR:……..….. **Waist Measurement (widest**):…….....

Body Fat %: …… **BMI**:…..…….……..……..

Body Trax completed □ **Yes** □ **No**

□ **Tier 1** □ **Tier 2** □ **Tier 3**

	Weight	Height	BMI
Week 1			
Week 12			

Feedback questionnaire

Name: _____ Referral Number _____

Venue Attending: Burscough Nye Bevan Park Pool Banks

At this stage of the programme, where would you rate your perceived level of fitness?
(1=poor/10=good)

Week 1	0	1	2	3	4	5	6	7	8	9	10
Week 12	0	1	2	3	4	5	6	7	8	9	10

How many times per week are you currently physically active?

Week 1	0	1	2	3	4	5	6	7 +
Week 12	0	1	2	3	4	5	6	7 +

Currently per week, on average, how much physical activity do you do?

Week 1 0min 1-30mins 30-60mins 60-90mins 90-120mins 120-150mins 150mins plus

Week 12 0min 1-30mins 30-60mins 60-90mins 90-120mins 120-150mins 150mins plus

How would you currently rate your level of fitness?

Week 1 Not active Slightly active Moderately Active Very active Extremely active

Week 12 Not active Slightly active Moderately Active Very active Extremely active

What physical activity do you currently do, in addition to your Active West Lancs activity?

Week 1 ……

Week 12……

(*WK 12 ONLY)* Do you feel your physical activity level has improved over 12 weeks? Yes No

(WK 12 ONLY) What benefits, if any, have you gained from attending Active West Lancs?

(WK 12 ONLY) Are you satisfied with the service provided? Yes No

(WK 12 ONLY) Any compliments/complaints/suggestions for the overall Active Weight.

I consent to my data being used for evaluation purposes for Active West Lancs and will allow my data to be used anonymously.

Signed: _____ Date:_____

NB For data purposes, a member from our Active West Lancs may contact you in 6 and 12 months time to complete a similar questionnaire.

Thank you for completing our feedback questionnaire to help improve our service.

Gym-Based Tier 1 Supervised Sessions

	Banks	Burscough	Nye Bevan	Park Pool
Mon		1.00pm-3.00pm	8.30am-9.30am 1.30pm - 3.30pm	8.00 am - 9:00am 1.30pm - 3.00pm
Tues		3.15 pm-5.00pm	11.15am-1.15pm 4.00pm-6.00pm	11.00am - 1.00pm 4.00pm-6.00pm
Weds	12.30pm - 2.00pm	9.45am - 11.45am 5.00pm - 7.00pm	1.00pm-3.00pm 5.00pm - 7.00pm	1.00pm-3.00pm 5.00pm - 7.00pm
Thurs			2.00pm – 3.30pm 4.00pm-6.00pm	2.00pm-4.00pm 4.00pm-6.00pm
Fri	10.00am - 11.30am	1.00pm-3.00pm	8.30am-10.30am 1.30pm-3.30pm	8.15am-10.15am 1.00pm-3.00pm

Additional Free Activities:

Weekly Health Walks: Burscough, Skelmersdale, Ormskirk & Banks

'Energise' Exercise Class –
Mondays: 9.30-10.30am West Lancs Youth Zone (opp Nye Bevan in Skelmersdale)

Active West Lancs office opening hours:
Wednesday-Friday, 8.00am - 4.00pm

Contact: ***Email :***

If you need to cancel a same day appointment, please inform the leisure centre directly:

Banks Leisure Centre: Tel:
Burscough Fitness & Racquets Centre: Tel:
Park Pool: Tel:
Nye Bevan: Tel:

Client Agreement - Active West Lancs

I would like to participate in the 12 week Active West Lancashire exercise scheme and understand that/agree to:

- Attend only the supervised sessions as agreed between myself and the Active Lives Team over the course of the 12 week scheme as discussed with the Active West Lancs team.
- Comply with instructions given by the Active West Lancs Team in terms of: How to use relevant equipment
- The intensity, duration and frequency of the exercises will be explained to me and I understand that a failure to adhere to the advice given may result in damage to myself or others.
- Attend any relevant appointments as arranged with the Active West Lancs Team or inform them if I am unable to attend. There will be assessment reviews at 6 weeks and 12 weeks
- Failure to attend 2 arranged appointments without informing the Active West Lancs Team or Active West Lancs Office will result in immediate discharge from the scheme.
- Inform the Active West Lancs team if I choose to leave the scheme before the 12 week time period so that the appropriate procedures can be put into place.
- Being discharged from the scheme will result in no longer being able to take part in future supervised sessions.
- Dropping out from the scheme without a satisfactory reason before the end of the 12 week scheme will result in ineligibility for re-referral to the scheme for 2 years.
- Contact the Active West Lancs team if I feel unwell during or after exercise
- Must inform the Active West Lancs team if there are any changes in my medications, medical conditions or deterioration in my conditions/status. **IT IS MY RESPONSIBILITY TO DO THIS.**

2. I understand that failure to comply with the above is my own responsibility and that the Active West Lancs team will not be held responsible for any consequences that failing to comply may have.

3. I understand that after the 12 week Active West Lancs programme has completed I will be discharged from the scheme and that the Active West Lancs service will no longer be responsible/accountable for any activity/exercise that I undertake.

4. I consent to my data being used for evaluation purposes for Active West Lancs and will allow my data to be used anonymously.

Client: ……. Staff Name …….
Signature:…… Signature:……
Date: _____/_____/_____ Date: _____/_____/_____

Completion Form

Name: _____ Referral Number _____

Discharge Date: _____

This is to confirm that you have now completed the 12 week Active West Lancs Programme and will now be discharged from the gym based scheme.
We hope you enjoyed the scheme and now feel more active!
Thank You

Taken out 6 months membership Yes / No

NB For data purposes, a member from our Active West Lancs may contact you in 6 and 12 months time to complete a similar questionnaire.

I consent to my data being used for evaluation purposes for Active West Lancs and will allow my data to be used anonymously.

Client Signature: _____ Date: _____

Officer Signature: _____ Date: _____

Appendix B) Interview guides

Chapter 7: Qualitative needs analysis (clients)
Interview guide (ERS Participants) (n=20)

Necessary preliminary information:

- Age
- Sex
- Height/Weight
- Socioeconomic status (Postcode and/or highest education level)
- Reason for referral onto ERS

Questions

Q1) Can you tell me a little about how you became and aware and involved/enrolled onto ERS?

Q2) What were your initial thoughts going into the scheme? Did you have any expectations about what ERS would entail?

Q3) Did you have any goals/ideas about what you wanted to achieve whilst on the scheme?

Q3a) If so, did these goals change at any point throughout the scheme?

Q3b) Do you believe you have achieved these goals via ERS attendance?

Q4) Looking back on your experiences throughout the course of this ERS, can you tell me about some of the things that you found enjoyable?

Q4a) And if you were to pick one thing about the scheme you particularly enjoyed?

Q5) Alternatively, based on your experiences, is there anything you would change about the scheme (E.g., thinking about the way it is delivered/administered)

Q6) Based on your experience, what do people generally have in common who take part in ERS? (if anything at all)

Q6a) Beyond medical/physical disorders, would you say there were any other common characteristics of ERS users?

Q7) Throughout the scheme, would you say you had ample opportunity to interact with your fellow ERS users?

Q8) Can you describe how important it was for you to be a part of this ERS group?

Q8a) Thinking about any bonds/friendships you may have formed during your time on ERS, is there anyone you became particularly close with? If so, could you tell me a little about them? (E.g., How did you become friends?)

Q9) What do you think is the general perception of ERS's among those who do not participate in them (i.e., what do those outside of the scheme think?)

Q10) Is there anyone here on the scheme you had a previous existing relationship with before enrolling on the scheme? (E.g., friends/neighbours who were on the scheme)

Q11) Following completion of ERS, do you plan to continue exercising regularly/going to the gym in the future?

Q12) Following completion, would you recommend others (e.g., friends/relatives) to ERS in the future? If so, why?

Q13) Were there any weeks/times during ERS where you were unable to attend for any reason?

Q13a) If so, why?

Reflection question

Q14) Looking back at your ERS experience, if you had to give any advice to somebody just starting the scheme (or thinking about whether ERS would be beneficial to them), what would you say to them?

Chapter 7: Optimizing the peer approach (Client interview guide)

Interview Schedule: ERS Clients

Pre-amble

Today is [insert day and date], the time is [insert time]. Thank you for agreeing to take part in this research. I would like to remind you that our discussions will be kept confidential and you will remain anonymous throughout this research. If there are any questions you do not want to answer, then that is perfectly fine. You also have the right to pause or exit the interview for any or no reason. If this happens, all data gathered from you will be destroyed. Are you happy to begin the interview?

Background and experiences of ERS

- Why did you decide to take part in ERS?
- Is there anyone here on the scheme you had a previous existing relationship with before enrolling on the scheme? (E.g., friends/neighbours who were on the scheme)
- How long have you been enrolled onto this ERS? Or when did you finish?
- How have/are you found your experience in ERS so far?
- Age, sex, primary reason for referral and goals wanted to achieve?

Social Interaction during ERS

- Throughout the scheme, have you interacted with your fellow ERS users and if so, what have these interactions typically involved?
- Thinking about any bonds/friendships you may have formed during your time on ERS, is there anyone you became particularly close with? If so, could you tell me a little about them? (E.g., How did you become friends?)
- Can you describe how important it was for you to be a part of this ERS group?
- Please tell me a little more about other social interactions or relationships of any kind you have developed throughout this process?
- What about your interactions with the GP referral officers? How would you classify their role during this process?
- What do these interactions involve?
-

Incorporation of volunteers/champions

As part of my collaboration with Active West Lancs', I am looking at the possibility of incorporating volunteers/champions into the service. These individuals would be involved in the sessions and would act as additional sources of support in the gym.

- What are your initial thoughts on this idea?
- What would you expect the roles and responsibilities of a volunteer/champion to be?
- What qualities or characteristics would a volunteer/champion need to have?

  Prompt- Age, Sex, Appearance, Medical history?
  Prompt – What about personal attributes?
- How important would it be for the individual to be relatable to yourself?
- How important is it that Champions have experienced the ERS scheme themselves as a participant?

Acceptability of Champions

- How useful would such an approach be within 'Active West Lancs'?
- What impact may this have on your own exercise behaviour?
- How attractive of a premise do you perceive being a champion to be? Would it be something you would consider? If so, why?
- How would you expect champions to be incentivised or rewarded for their involvement?
- How long would you expect to commit to acting as a champion?

Reflections

- Have you ever been involved in a scenario/environment where champions/volunteers were involved? If so, can you remember what impact this may have had on your behaviour?

Post-amble

Thank you for taking part in the interview. I want to repeat that all information gathered today will be kept confidential. Do you have any questions or further details that may help my research?

- What do you mean by that?
- Can you tell me a little more about that?
- Can you give me some examples?
- Why do you say that?
- What has influenced that perception?

Interview Schedule: GP Referral Officers

Pre-amble

Today is [insert day and date], the time is [insert time]. Thank you for agreeing to take part in this research. I would like to remind you that our discussions will be kept confidential and you will remain anonymous throughout this research. If there are any questions you do not want to answer, then that is perfectly fine. You also have the right to pause or exit the interview for any or no reason. If this happens, all data gathered from you will be destroyed. Are you happy to begin the interview?

Background and experiences of ERS

- How long have you worked in exercise referral?
- Why did you decide to work in exercise referral?
- How long have your worked at 'Active West Lancs'?
- What does your role involve?
- Age and sex?

Incorporation of volunteers/champions

As part of my collaboration with Active West Lancs', I am looking at the possibility of incorporating volunteers/champions into the service. These individuals would be involved in the sessions and would act as additional sources of support in the gym.

- What are your initial thoughts on this idea?
- What would you expect the roles and responsibilities of a volunteer/champion to be?
- What qualities or characteristics would a volunteer/champion need to have?
- Prompt- Age, Sex, Appearance, Medical history
- Prompt – What about personal attributes?
- How would you envisage champions working alongside yourself?
- What are your thoughts on being responsible for the champions in a supervisory capacity?

Acceptability of Champions

- How useful would such an approach would be within Active West Lancs'?
- What potential impact may such an approach have on clients' exerciser behaviour?
- How attractive a premise do you perceive it to be an for clients to act as champions?
- Would you expect champions to be incentivised or rewarded for their involvement? If so, how?

- How long would you expect champions to commit their time throughout the week?

Training and Recruitment

- How important is it that Champions have experienced the ERS scheme?
- How do you think Champions would be best identified and selected?
- Who would/should be involved in the identification/selection of Champions?
- What do you think the training of Champions should definitely involve?

Reflections

- Have you ever been involved in a scenario/environment where champions/volunteers were involved? If so, can you remember what impact this may have had on behaviour?

Post-amble

Thank you for taking part in the interview. I want to repeat that all information gathered today will be kept confidential. Do you have any questions or further details that may help my research?

Notes: Where appropriate, the following clarification, expansion, probe and supplementary questions will be asked:

- What do you mean by that?
- Can you tell me a little more about that?
- Can you give me some examples?
- Why do you say that?
- What has influenced that perception?

Chapter 9: Peer support experiences (Clients interview guide)

Interview Schedule: AWL Clients

Pre-amble

Today is [insert day and date], the time is [insert time]. Thank you for agreeing to take part in this research. I would like to remind you that our discussions will be kept confidential and you will remain anonymous throughout this research. If there are any questions you do not want to answer, then that is perfectly fine. You also have the right to pause or exit the interview for any or no reason. If this happens, all data gathered from you will be destroyed. Are you happy to begin the interview?

Background and experiences of Active West Lancs

- Why did you decide to take part in Active West Lancs?
- Is there anyone here on the scheme you had a previous existing relationship with before enrolling on the scheme? (E.g., friends/neighbours who were on the scheme)
- How long have you been enrolled onto Active West Lancs? Or when did you finish?
- How have you found your experience with Active West Lancs so far?
- Age, sex, primary reason for referral and goals wanted to achieve?
    - Have you achieved them? Or on the way to achieving them?

Experiences of Peer Support

There have been volunteers within the gym throughout your time on the scheme.

- Do you recall interacting with an AWL volunteer throughout your time on the scheme?
    - If so, please can you describe to me your first experience with the volunteer(s)? E.g., How did you meet?
    - What did you think of the volunteers when you were first introduced?
    - Please can you describe any other interactions between yourself and the volunteer?
        - E.g., can you perhaps walk me through how a typical session might go when you attend the gym with a volunteer present?
        - Prompt – What are your interactions with the volunteer like now?
        - Do you still interact with them?
            - If not, why not?
- Please can you describe any way you can think of that the volunteer may have had an impact on your AWL experience?

- Please can you describe to me what you think the role of the volunteer has been whilst you have been on the scheme?
    - Is there anything the volunteer has done that you think has been particularly useful?
    - Is there anything else you'd have liked the volunteer to do to further assist you on the scheme?
- Do you think the volunteer is suitable for their role?
    - Can you think of any physical or personal characteristics that would be beneficial for peers to have?
        - E.g., age, sex, personality.
        - Qualities such as humour for example?
- What about your interactions with the GP referral officers? How would you classify their role during this process?
- What do these interactions typically involve?
- Please can you describe how the combination of support provided by volunteers and GPROs works?
    - Does such a partnership approach work well?
    - What would you say are the key differences between volunteers and GPROs?

Social Interaction during Active West Lancs

- Can you please describe what it has been like to be a part of this scheme?
- Throughout the scheme, have you interacted with your fellow scheme users and if so, what have these interactions typically involved?
- Thinking about any bonds/friendships you may have formed during your time on the scheme, is there anyone you became particularly close with? If so, could you tell me a little about them? (E.g., How did you become friends?)
    - Did the volunteer have any influence in the development of your friendships here?
        - If so, how?
- Could you please tell me a little more about other social interactions or relationships of any kind you have developed throughout this process?

Reflection

- Just to wrap up, could you please summarise your experience interacting with volunteers and your most important point of advice to improve the volunteer system moving forward?

Future

Do you intend to carry on using the gym after your time on the scheme finishes?

Post-amble

Thank you for taking part in the interview. I want to repeat that all information gathered today will be kept confidential. Do you have any questions or further details that may help my research?

- What do you mean by that?
- Can you tell me a little more about that?
- Can you give me some examples?
- Why do you say that?
- What has influenced that perception?

Interview Schedule: Exercise referral officers

Pre-amble

Today is [insert day and date], the time is [insert time]. Thank you for agreeing to take part in this research. I would like to remind you that our discussions will be kept confidential and you will remain anonymous throughout this research. If there are any questions you do not want to answer, then that is perfectly fine. You also have the right to pause or exit the interview for any or no reason. If this happens, all data gathered from you will be destroyed. Are you happy to begin the interview?

Experiences

1) Please can you tell me little about your experiences working with the volunteers?

Role play

2) I'd like you to pretend I was a new client on the scheme, I'd had my induction and was just about to enter the gym. Please can you walk me through the process of integrating me into the gym.
    a. How does the volunteer become involved?
3) Ok, now let's pretend I am one of the volunteers. I have just received my training from myself…and now I'm under your charge. How does the process work?
    a. What information did you give to volunteers before starting?
    b. Did you give any advice?

Volunteer acceptability

1) Do the clients on the scheme appear to be receptive to the volunteers?
2) Are the volunteers acceptable to the current schedule of 2x a week?
    a. Have there been many instances where volunteers have not been able to attend?
        i. Have they communicated this to you ahead of time?

Recruitment

3) Did we get the recruitment right?
4) Was the training provided to volunteers sufficient?
    a. Have there been many times where volunteers have come to ask for your support
        i. What support/further information are they generally seeking?
5) Now that you've been able to see the peers in action, is there anything you think could be done to enhance the peer role?
    a. Anything other roles the peers could fulfil?

b. Any roles they are doing now that perhaps they should not carry on doing?

Management of peers

6) Can you tell me a little about your experiences being responsible for managing the peers on a day to day basis?
    a. Have there been any issues you can remember?
    b. Do you feel that you have been sufficiently supported in managing peers?
        i. Is there anymore that could be done?
    c. Benefits?

Future

7) Based on your experiences, what do you think could be done to enhance the volunteer programme?
    a. What do you think about the prospect of recruiting more volunteers?
        i. Would there be any influence on the scheme users?
        ii. Any anticipated impact for yourself?
    b. Do you anticipate there would be any recruitment problems? I.e., can you think of anyone on the scheme now that wold be suitable?
        i. Anyone you can think of that would add anything that isn't already provided?
8) Have you any further concluding remarks to summarize your experiences working with volunteers? Or any key advice for continuing the volunteer system moving forward?

Interview Schedule: Peers

Pre-amble

Today is [insert day and date], the time is [insert time]. Thank you for agreeing to take part in this research. I would like to remind you that our discussions will be kept confidential and you will remain anonymous throughout this research. If there are any questions you do not want to answer, then that is perfectly fine. You also have the right to pause or exit the interview for any or no reason. If this happens, all data gathered from you will be destroyed. Are you happy to begin the interview?

Experiences

1) Can you just tell me a little about your experiences as a volunteer so far?
    a) How have you found the experience, personally?
2) What are the people like who generally access the gym during your volunteer sessions? I.e., what is the makeup of the sessions?
    a) Age, sex?
    b) Number of people using gym during volunteer sessions.
        i. Are these generally the same people, on a consistent basis?
        ii. Is the gym busy with non-ERS users during these sessions?
3) Do ERS clients appear to be willing to talk and interact with you?
    a) What do these interactions typically involve?
    b) Do they appear to be receptive to any advice you may have offered?
        i. Any common questions you get asked by ERS clients?
        ii. Do people share info on their reasons for referral?
            1. Have they ever asked you about your own?

Role play

4) Say I was a new ERS client, can you please walk me through the process from my induction where GPRO first brings me into the gym?
5) How would your first interaction/conversation go with the person who comes in?

Training

6) Now that you've had chance to experience the volunteer role first-hand, would you say that the training we provided sufficiently prepared you for the role?
    a) Have there been any unexpected surprises?

Issues?

7) Are there any areas, moving forward, that we could look at to make the volunteer system run smoother?

8) Please could you discuss any problems you've come across in any way?
    a) Scheduling of volunteer sessions (e.g., 2 days a week system)
9) How does the interaction work between you and GPRO?
    a) Communication channels with GPROs

Ongoing support

10) Can you think of anything that we can do to support you further in your role as a peer?
11) Could you please tell me about any impact you believe the volunteer role may have had on your own PA behaviour or well-being?
12) Have you any further concluding remarks on your experience as a volunteer and advice for continuing the volunteer system moving forward?

Post-amble

Thank you for taking part in the interview. I want to repeat that all information gathered today will be kept confidential. Do you have any questions or further details that may help my research?

Appendix C) Quantitative data collection measures

Appendix C.1) IPAQ-E

International Physical Activity Questionnaire

Name……. Sex (F/M) Age……yrs

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives.

The questions will ask you about the time you spent being physically active in the last 7 days.

Please answer each question even if you do not consider yourself to be an active person.

To describe the intensity of the physical activity, two terms (Moderate and Vigorous) are used:

Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal.

Thank you for participating!

1. The first question is about the time you spent sitting during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

During the last 7 days, how much time did you spend sitting during a day?

____ hours ___ minutes

---

2 Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

_____ Days ⇒ How much time did you usually spend walking on one of those days?

or

☐ No day ____ hours ___ minutes

---

3. During the last 7 days, on how many days did you do moderate physical activities like gardening, cleaning, bicycling at a regular pace, swimming or other fitness activities.

Think *only* about those physical activities that you did for at least 10 minutes at a time. Do not include walking.

_____ Days ⇒ How much time did you usually spend doing moderate physical activities on one of those days?

or

☐ No day ____ hours ___ minutes

---

4. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, heavier garden or construction work, chopping woods, aerobics, jogging/running or fast bicycling?
Think *only* about those physical activities that you did for at least 10 minutes at a time.

_____ Days ⇒ How much time did you usually spend doing vigorous physical activities on one of those days?

or

☐ No day ____ hours ___ minutes

Appendix C.2) SWEMWBS

The Short Warwick–Edinburgh Mental Well-being Scale (SWEMWBS)

Below are some statements about feelings and thoughts. Please tick the box that best describes your experience of each over the last 2 weeks

STATEMENTS	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5

Appendix D) Peer intervention details and training materials

Appendix D.1) Additional peer training materials

Q. You are approached by an AWL participant and asked for guidance on an issue that falls outside of the agreed parameters of the PEER role? The individual wants to know how to build strength in their upper back. How do you respond?

- You do your best to provide examples of exercises designed to strengthen the back
- You politely inform the individual that this is not your role and move the conversation on
- You immediately go to find [ERO] to ask her for a list of back exercises
- Other response?

Q. A new participant has started on the AWL scheme. It is your role as a PEER to help them to feel more socially supported. How do you go about doing this?

- 1. You come straight over to the individual and introduce yourself and begin to question the individual on their background and gather personal details
- 2. You find out the individuals name and go over to the front desk to ask the gym assistant's to make an announcement that they have a joined the scheme
- 3. You ignore the individual for a couple of sessions to let them get used to the scheme
- 4. Other response?

Q. You have welcomed a new user to the scheme in line with the guidance you have received. However, they do not appear to be receptive to your help or show willingness in interacting with you? Do you…

1. Persevere. It is your role to provide social support to these individuals.

2. Leave the individual to their own devices. If they don't want your help, then that's their prerogative

3. Take a backwards step whilst keeping a vigilant eye on the individual's progress/attendance. Be polite and courteous each time you see them. Mention to [ERO] that this individual may be at risk for becoming socially isolated/withdrawn

4. Other response?

Q. An ongoing personal issue is impacting your ability to perform the PEER role. What do you do?

Persevere through the issue in the hope that it will resolve itself

Discuss details of the issue with AWL participants. A problem shared is a problem halved.

Tell [ERO] that there is an issue and exactly what the issue is.

Other response?

Appendix D.2) Peer protocols.

PEERs Intervention Protocol (Peers)

1) Prospective volunteers identified by site-specific exercise referral officers (EROs) using PEER identification checklist (over a 2-week period in late August 2019)
    a. Reasons will be noted by EROs for any prospective volunteers that are approached but decline.
2) RP meets with site-specific EROs to challenge and discuss goodness of fit between identified prospective volunteers and PEER identification checklist (45-minute consultation)
3) Agreed prospective volunteers invited to 'volunteer training' at their respective ERS gym facilities. Training is delivered by RP in the presence of site-specific EROs and ERO supervisory manager. Training delivered in accordance with PEER guidance document (Approx. 1-hour)
4) Volunteers sign the declaration as receipt of their training and indicate their availability for at least one hour during supervised sessions per week
5) Volunteers undergo a full gym re-induction delivered by their site-specific ERO. Inductions are to be carried out in group format. During this process, volunteers are shown an ERS client exercise programme card and asked to demonstrate to the ERO how they would follow it (Approx. 1 hour)
6) Upon completion of their re-induction, volunteers are provided with an AWL volunteer t-shirt and given a start date.
7) For their first 2 sessions, volunteers will be closely monitored/shadowed by site-specific EROs. That is, GPROs will have no client consultations during this period and will exclusively accompany volunteers on the gym floor

8) After completion of this initial 2-week period, RP and EROs will discuss the performance of the volunteers. If deemed competent/satisfactory, EROs will 'sign off' for the volunteers to be in the gym whilst EROs may have other ERS client consultations (Approx. 15 mins)
    a. If EROs are not comfortable signing off on volunteers, there will be a discussion between RP and EROs on how to proceed. E.g., whether the volunteer may need an extra week or two to get up to speed or whether they are ultimately deemed to be unsuitable for the volunteer role
9) If approved by EROs, from week 3 onwards volunteers will be made aware of new AWL starters, as well as AWL clients who have upcoming 6 and/or 12-week appointments (one week's notice where possible).
10) At week 6, volunteers will be observed by RP and the ERO supervisory manager. Observations will be undertaken over the course of 1 hour of a supervised session and assessed using an adapted checklist in accordance with the PEER guidance document
11) At week 6 and following their observation, RP will conduct short semi-structured interviews with volunteers (Approx. 20 minutes). The interviews will include;
    i. Perceptions of volunteers own performance
    ii. Details of volunteer's experiences to date (e.g., challenges faced)
    iii. Provision of feedback from RP's observations
    iv. Opportunity for volunteer to identify need for additional support/guidance
12) At week 12 the volunteers will finish their initial stint. At this stage, RP will conduct more in-depth interviews with volunteers.

* All other volunteer support will be overseen informally by site-specific GPROs who will relay necessary feedback to RP intermittently. GPROs will also record the number of sessions

that PEERs attend per week and, where necessary, notify RP of any reasons volunteers give to explain non-attendance.

PEERs Intervention Protocol (Clients)

(Protocol for AWL clients at all centres unless otherwise stated)

Note: Inclusion criteria: Only those aged 50 years and over will be included in the data analysis. This decision has been made for clarity and to narrow the focus. An estimated 75%+ percentage of all AWL clients fall into this age group and under 50's that do access AWL would not typically use the gym during times (i.e., afternoons) when the PEERs would be operating (i.e., usually due to other job/family commitments).

1) Week 1 – Clients attend an initial assessment appointment and provide demographic information pertaining to:
    a. Age
    b. Sex
    c. Reason(s) for referral
    d. Route of referral (i.e., GP or self-referral)
    e. Height/Weight
    f. Blood pressure
    g. Postcode (will substitute for final education level if deemed necessary)
    h. ERS goals
2) Clients also complete psychometric questionnaires to assess
    a. PA levels (IPAQ)*
    b. Well-being (SWEMWBS)
        i. *subsample of approx. 15% will be asked to wear wrist-worm accelerometers for a 9-day wear period. Efforts will be made to recruit an even sex split of varying ages.

Note: A brief note will be added to the client induction documentation/process to inform clients that volunteers may be present in the gym during supervised session times. Clients will be informed that PEERs can be identified by their AWL t-shirts and are there for their benefit. Clients will be advised that volunteers are to be approached and may answer non-specialist gym-related questions. ***Test conditions (i.e., centres) only***

3) Clients receive a full gym induction from their ERO and are placed on to a Tier 1 membership (i.e., supervised gym access only)

4) All clients receive a bespoke exercise programme card provided by their ERO.

5) Apart from exceptional circumstances, all clients will remain on Tier 1 memberships until at least week 6.
    a. Attendance of Tier 1 AWL clients at supervised gym sessions is tracked and managed by site-specific EROs weekly.
6) At week 6, clients have an informal consultation with EROs to discuss and review progress (i.e., modify the exercises/intensity of their respective programme cards). *Implementation and structure of these 6-week appointments are inconsistent across centres, i.e., some do them, so don't. Clients do not currently fill out any psychometric measures at this stage and this proposal will most likely be rebuffed by EROs)
    a. Following their 6-week appointment, it may be requested or agreed for clients to progress on to Tier 2 membership (i.e., unsupervised gym access allowed)
    b. Those who were approached to wear accelerometers during week 1 will be approached to do so again

Note: If clients do progress on to Tier 2 membership, their attendance for Tier 1 sessions can still be tracked as they still have to attend at least one supervised session per week. However, it will be less clear how frequently they may continue accessing the gym outside of these times.

7) All clients complete the scheme following week 12 and provide the following demographic information:
    a. Weight
    b. Blood pressure
8) Clients also fill out psychometric measures for:
    a. PA (IPAQ)*
        i. *Subsample wear accelerometers again
    b. Well-being (SWEMWBS)
    c. Social identification measure to assess identification with fellow ERS members
    d. Leadership inventory***Test conditions only***
9) All clients who complete the scheme (Up to approx. 10 per centre) will be invited to attend a semi-structured interview with RP to discuss their experiences on AWL. *****Including their perceptions of the PEER role ***Test conditions only***

10) All completers will be asked to indicate their PA plans following AWL completion (i.e., 6-month sign up or not).

Note: All participants who drop out of the scheme will be noted and asked to provide a reason by their respective EROs

Additional information

As PEERS will not be present in every supervised session, it is possible for Tier 1 clients to attend supervised sessions where volunteers are not present.